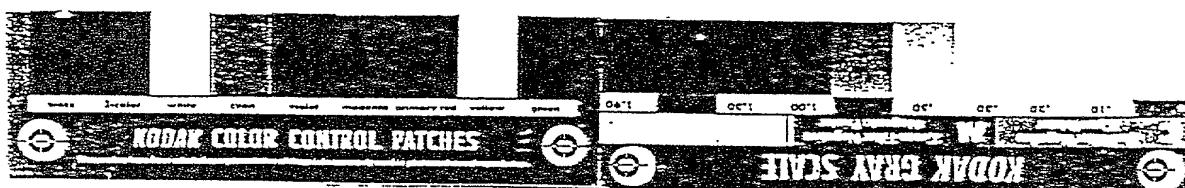


Fig. 1

Color comparison of various passive layers



Substrate: Zinc-plated screws

Blue chromation: Left picture half
Invention: Center
Yellow chromation: Right picture half

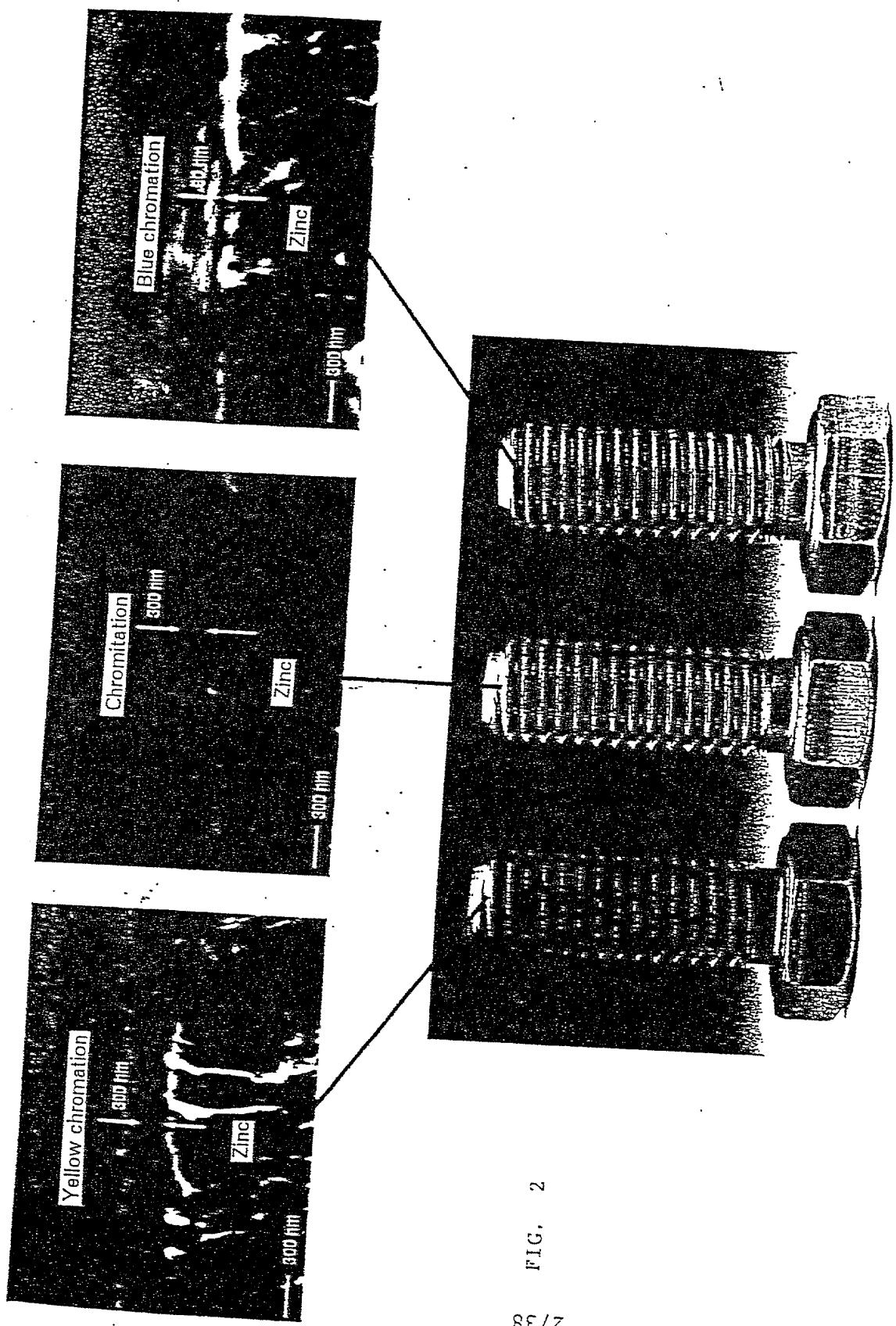


FIG. 2

Fig. 3

Bandwidth of iridescence according to the present invention
(on zinc-plated screws)

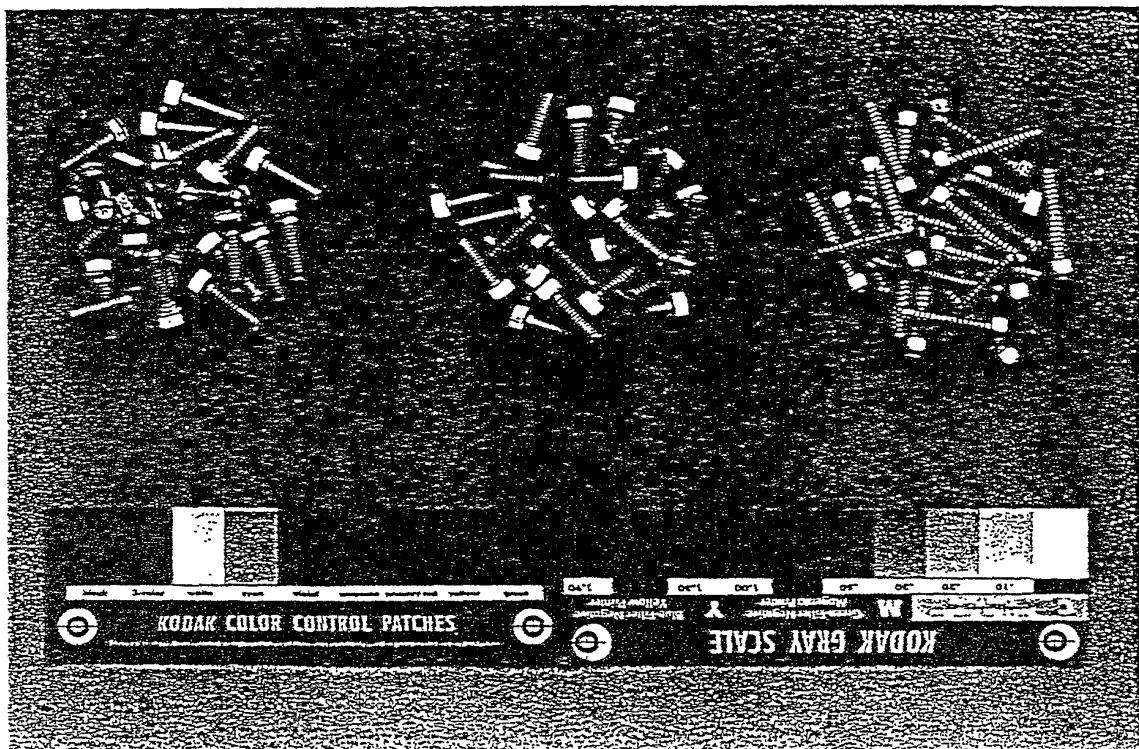
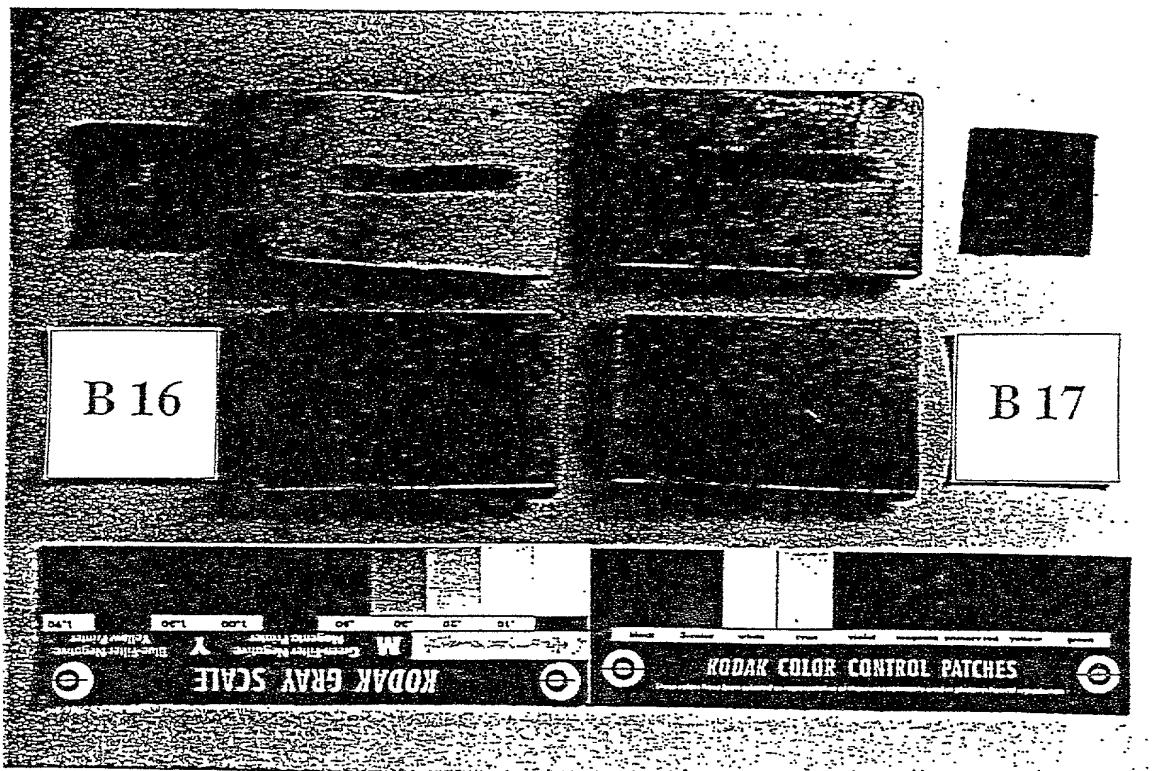


Fig. 4

Comparison test with EP 0 034 040

Example 16

Example 17



The upper picture half, one the outer left and right, shows a black cloth whereby the abrasions on the metal sheets shown in the top picture half were obtained. Layer portions - discernible as whitish stains - are on both pieces of cloth. The lower picture half shows the unmarred layers of the prior art.

Substrate: Zinc-plated steel sheet.

Diagram 1

5

Pattern 1, Measurement Position A

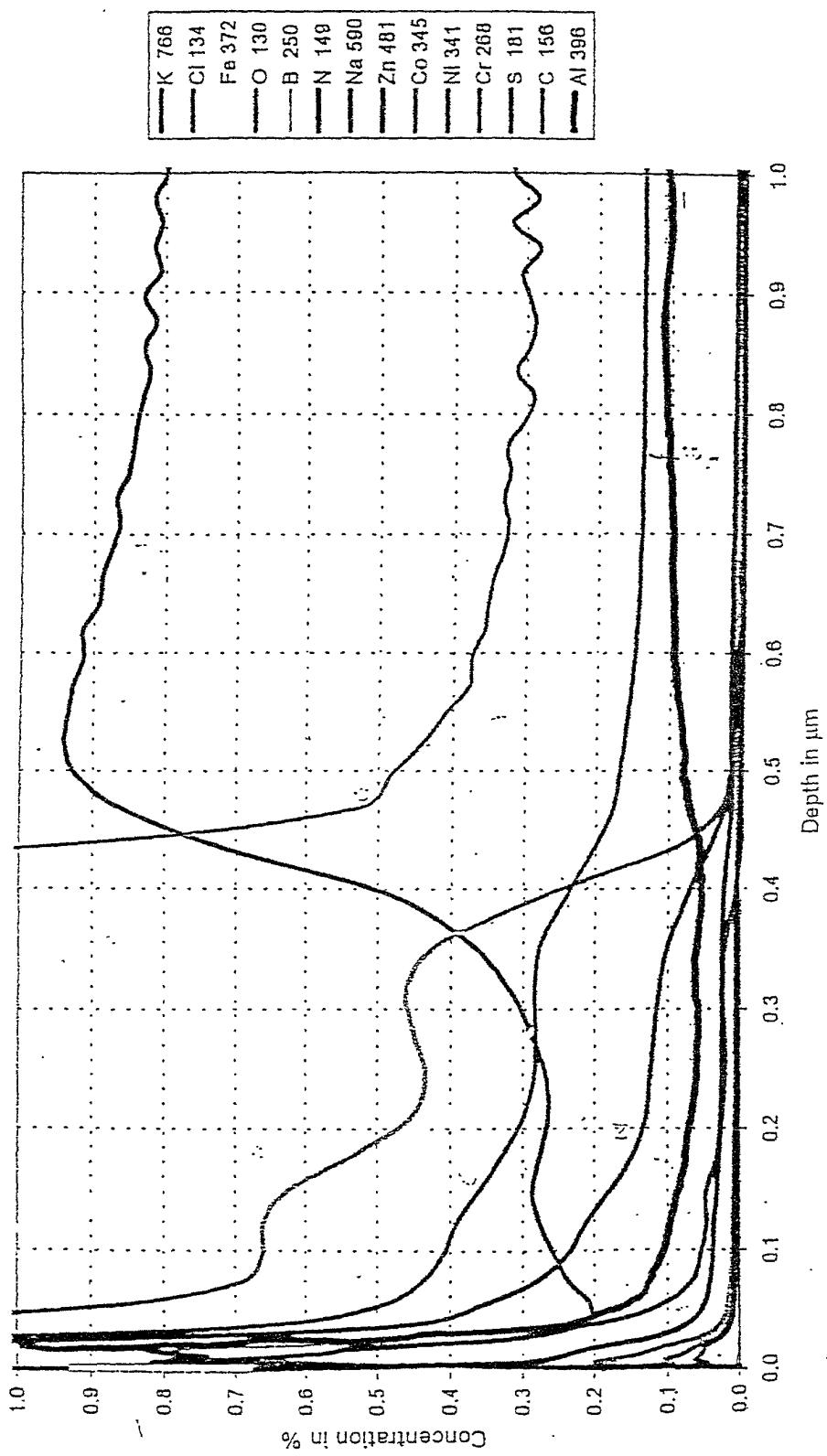


FIG. 6

Diagram 2

Pattern 1, Measurement Position A

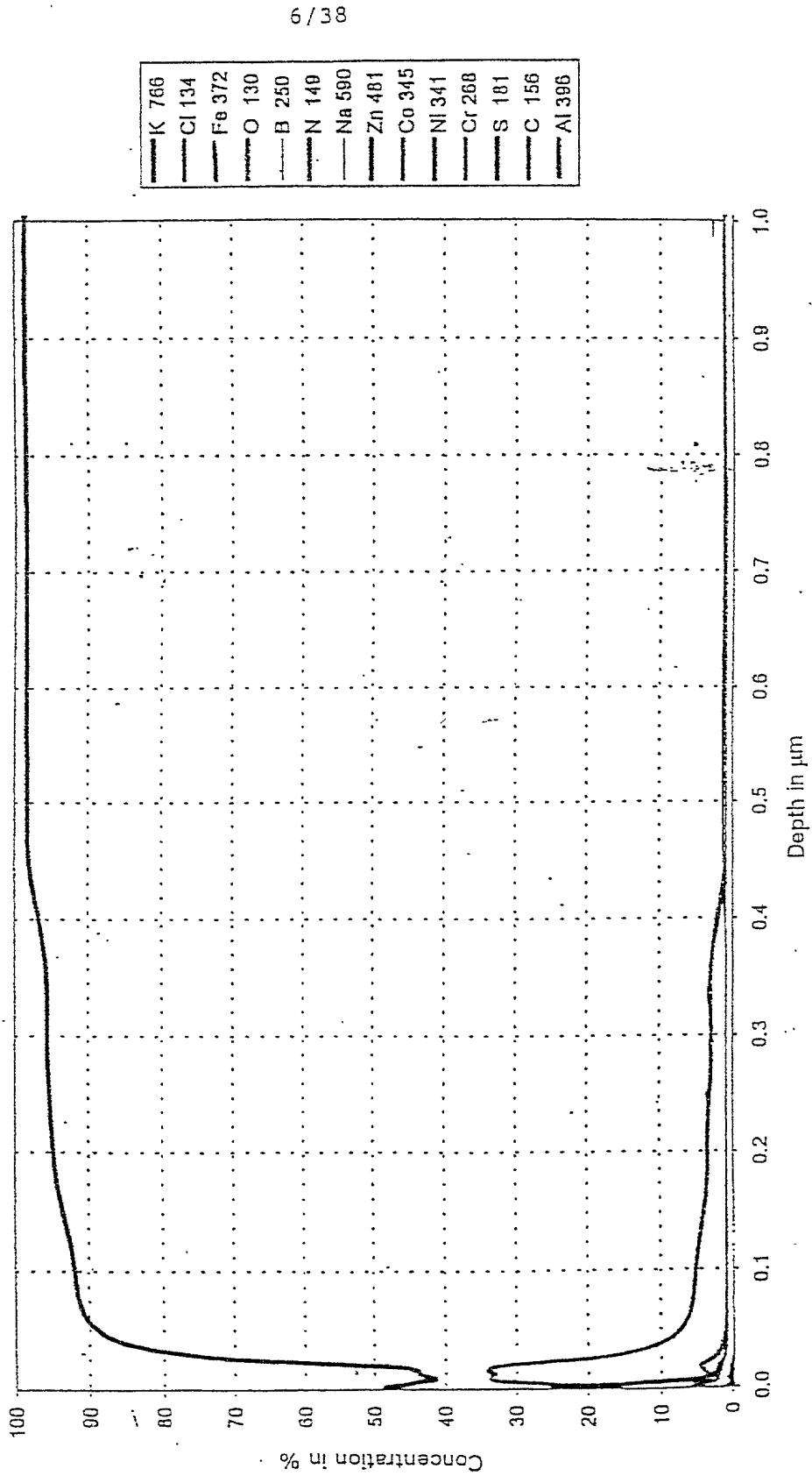


Diagram 1

Sample 1, Measurement Position B

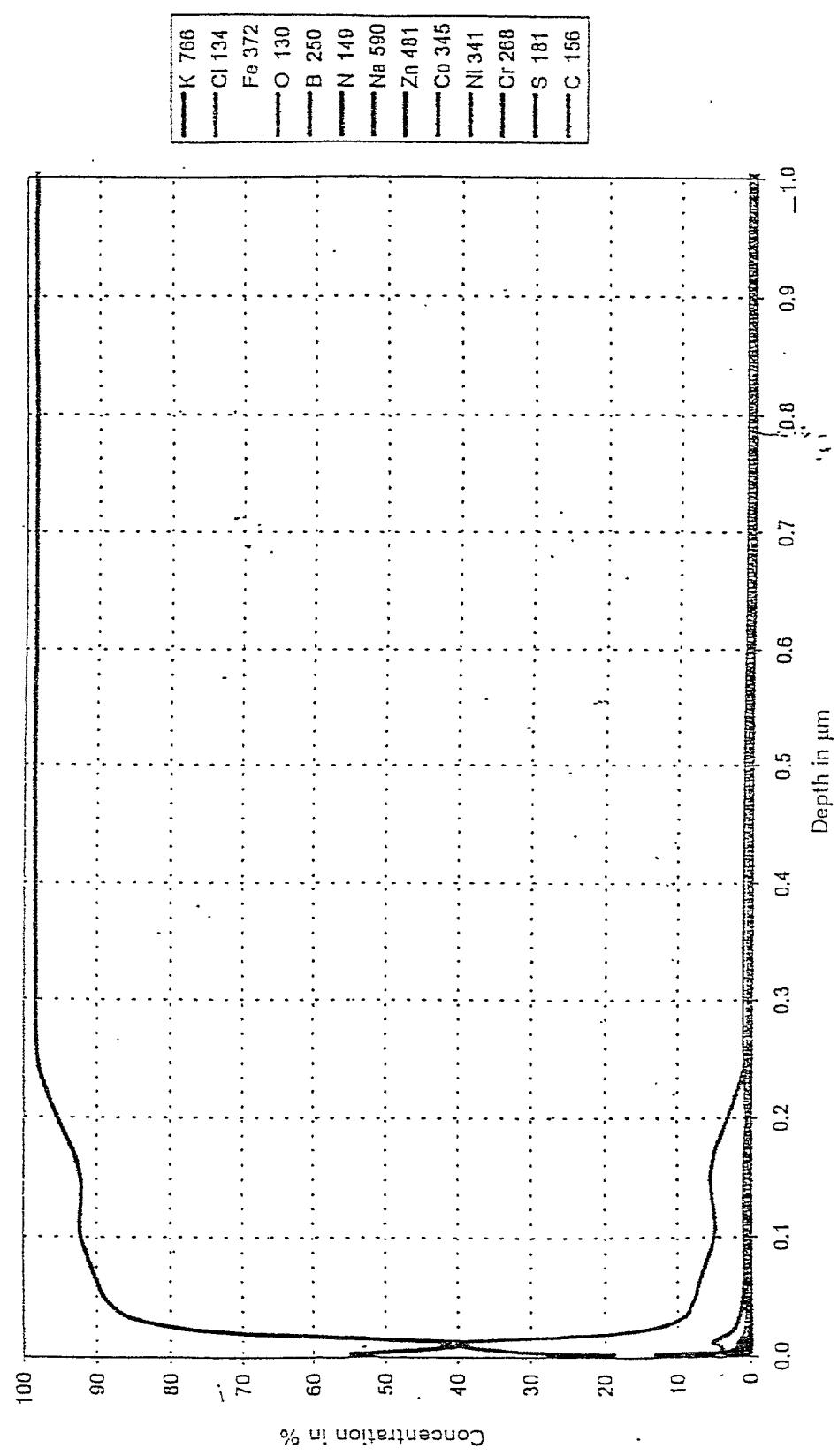


FIG. 8

Diagram 2

Sample 1, Measurement Position B

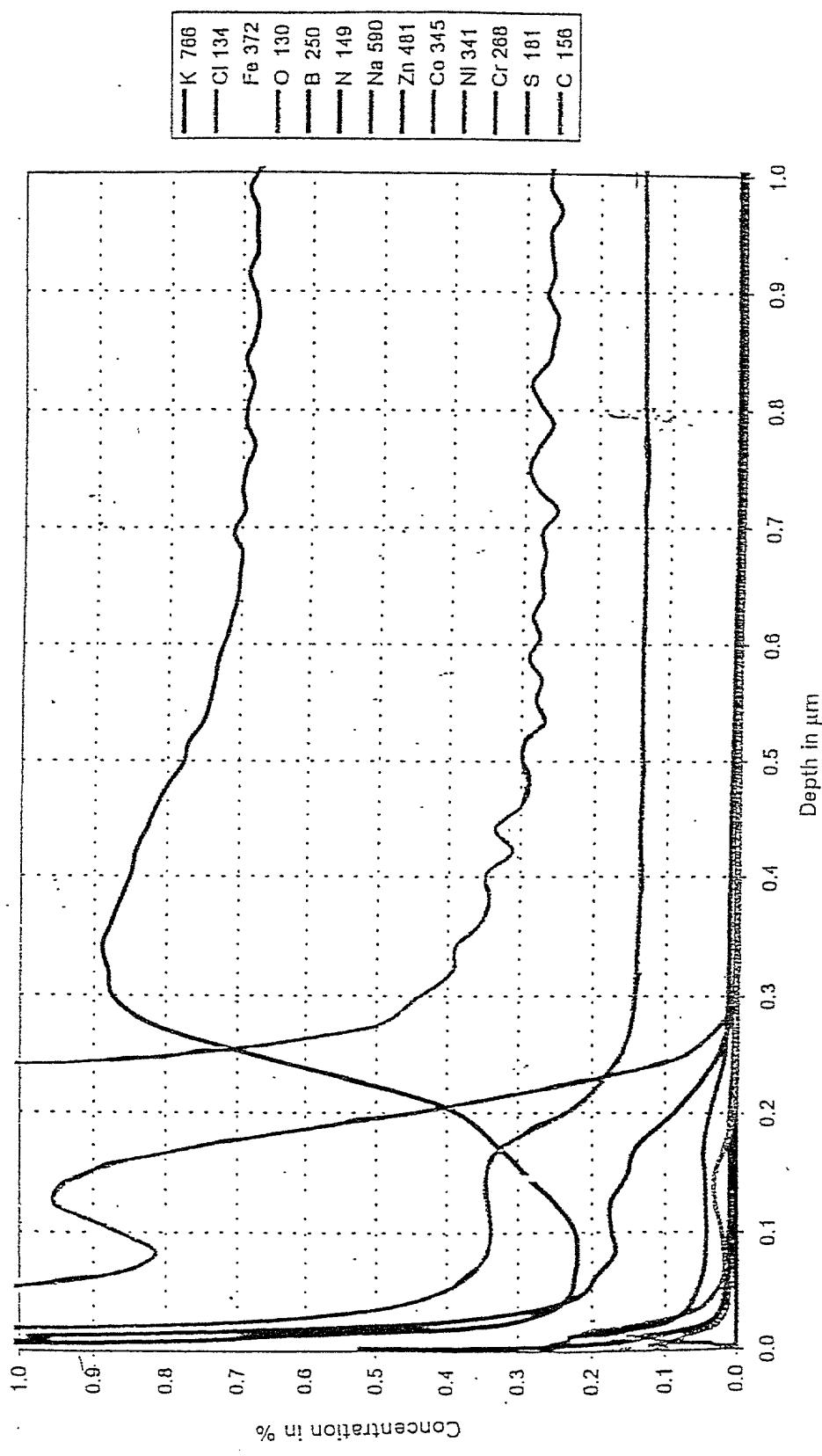


Diagram 1

Sample 2, Measurement Position A

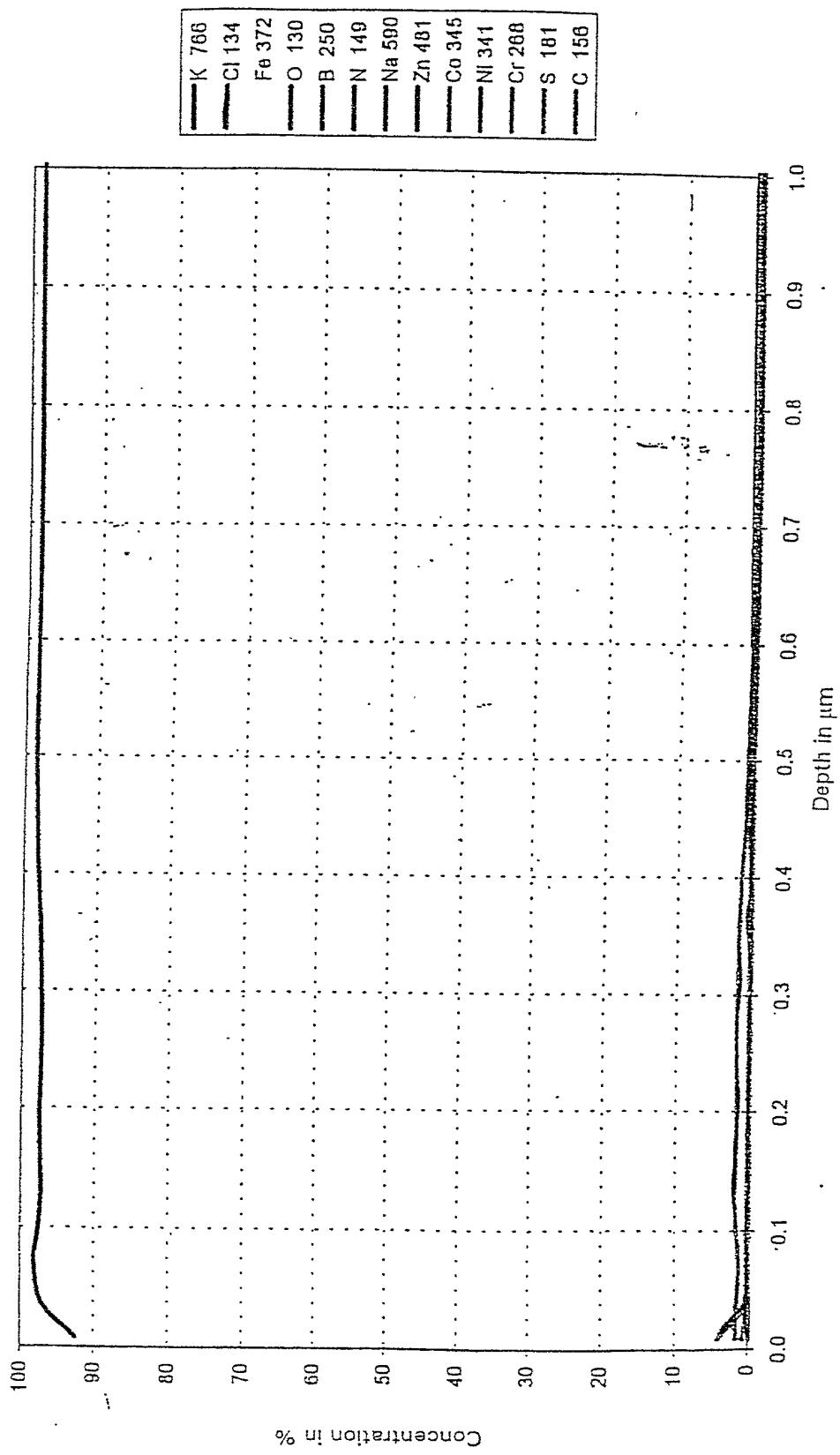


FIG. 10

Diagram 2

Sample 2, Measurement Position A

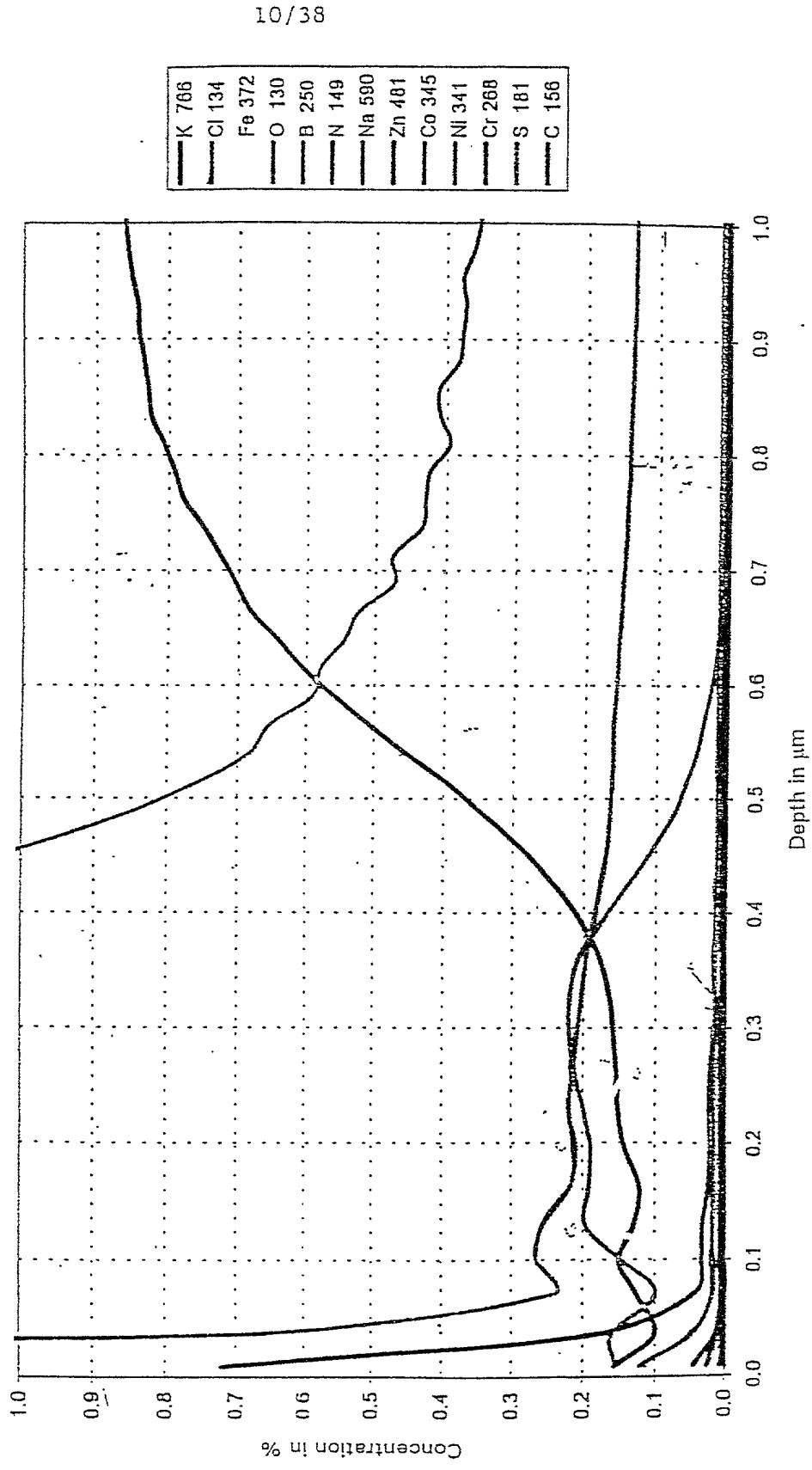


FIG. 11

Diagram 1

Sample 2, Measurement Position B

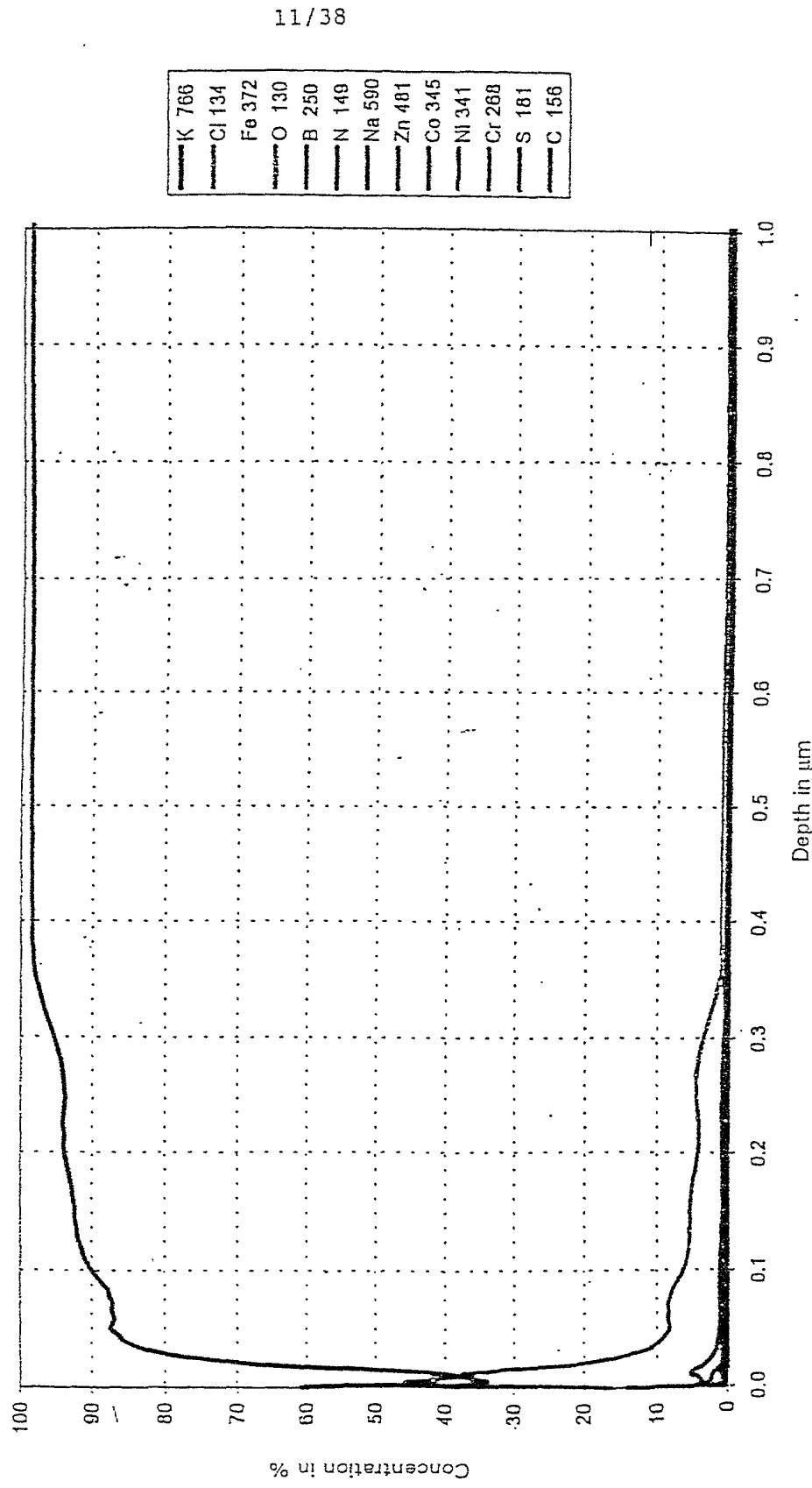
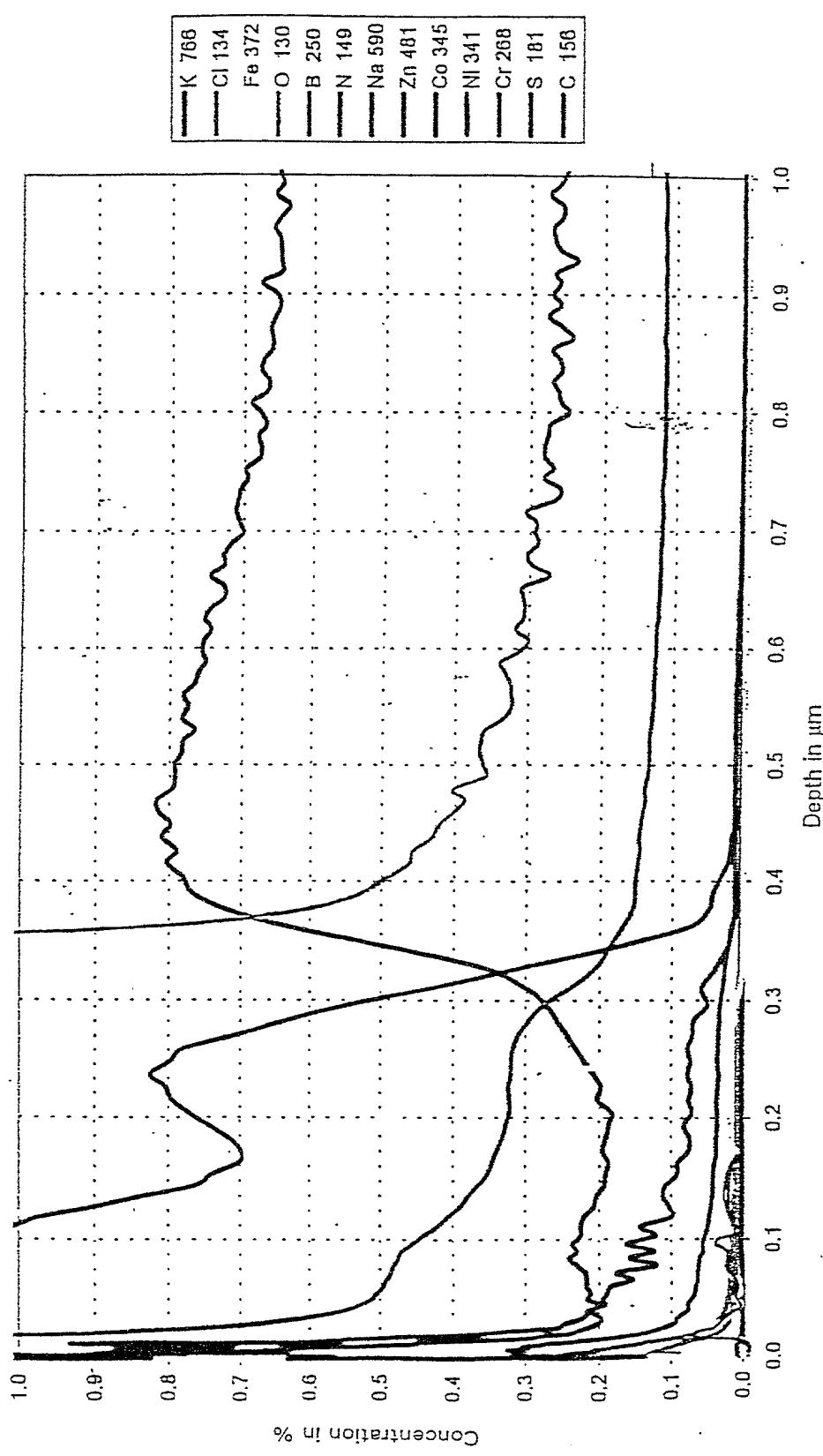


Diagram 2

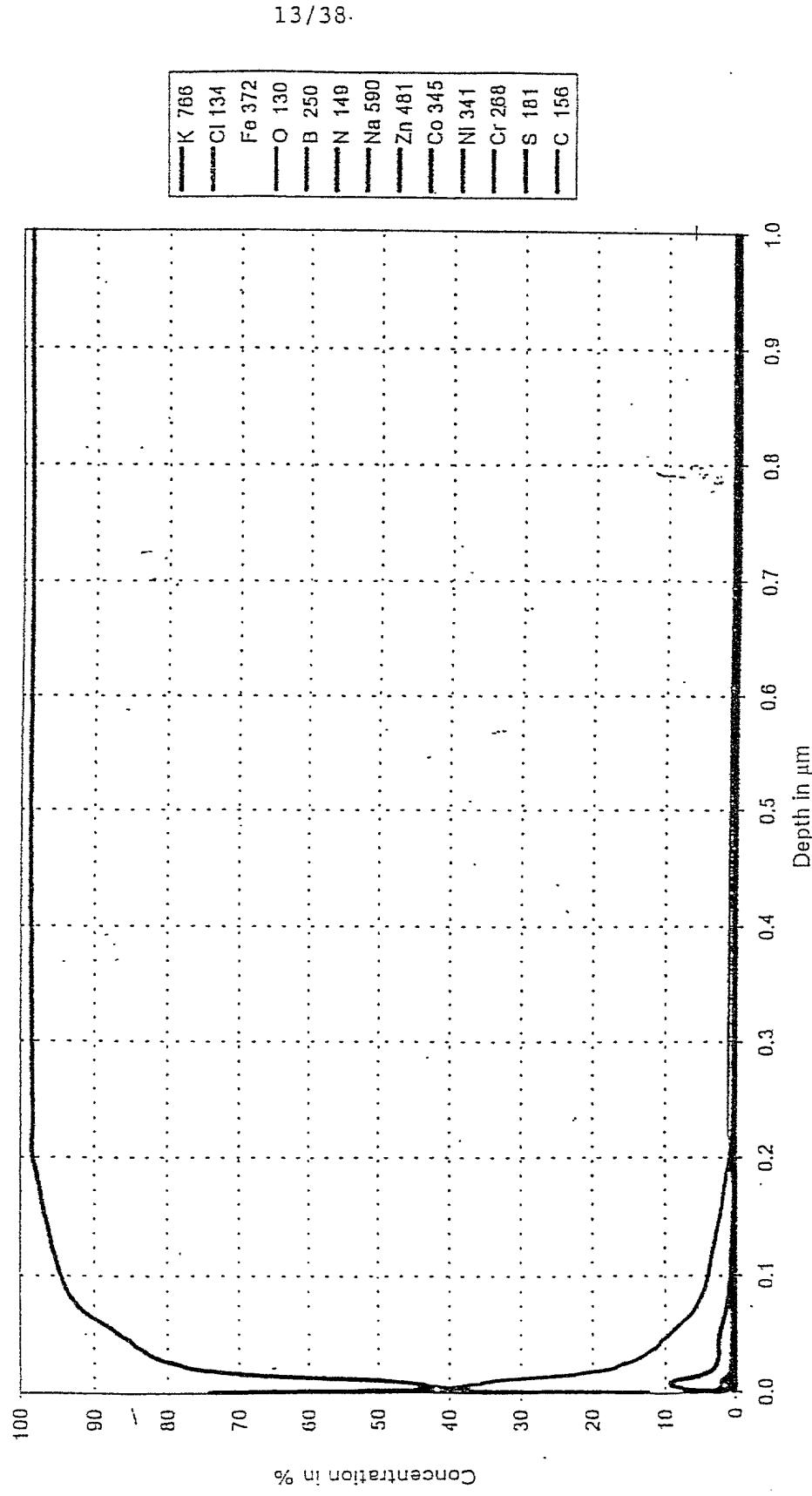
Sample 2, Measurement Position B



16, 13

Diagram 1

Sample 3, Measurement Position A



Sample 3, Measurement Position A

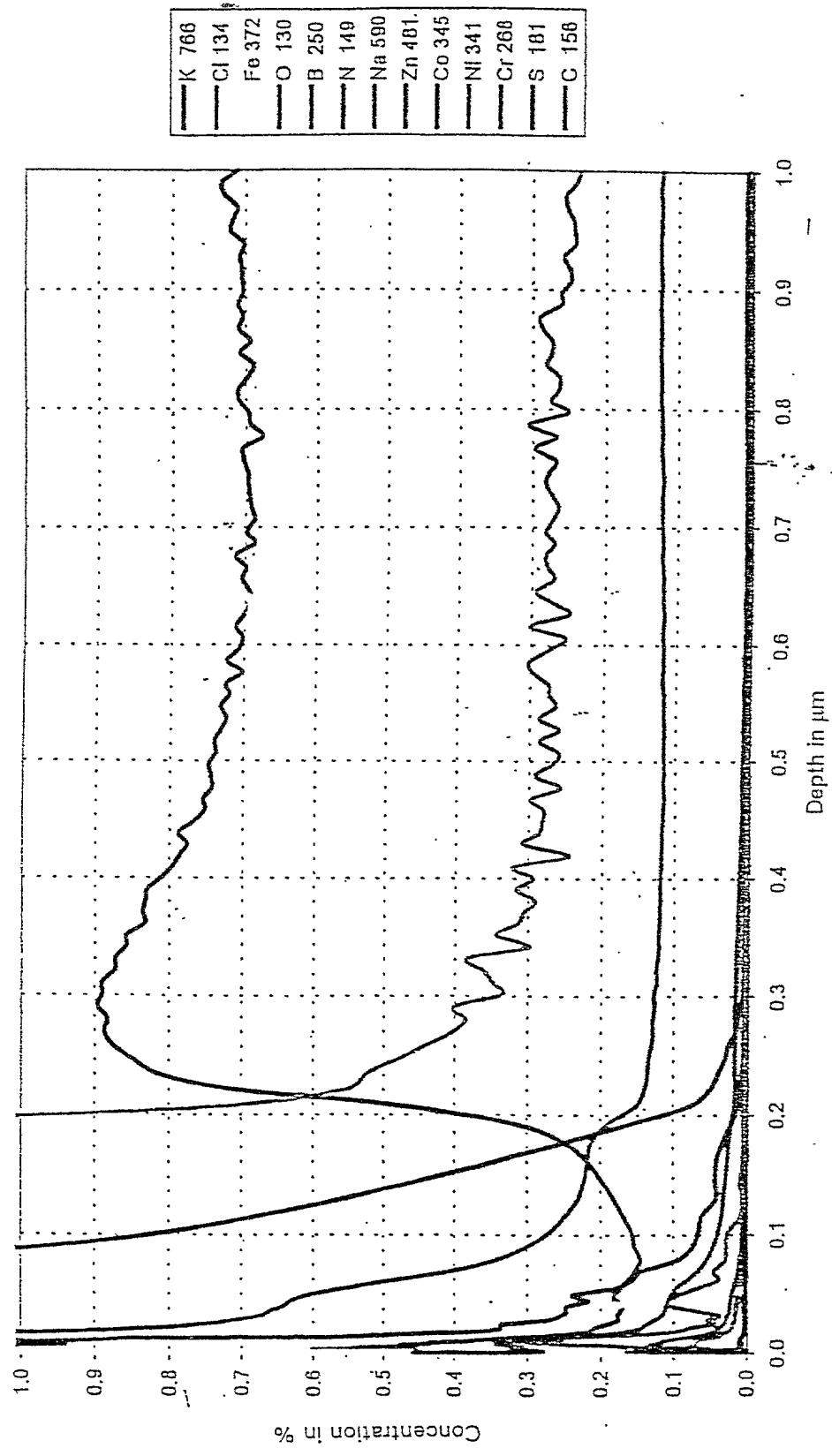


FIG. 15

Diagram 1

Sample 4, Measurement Position A

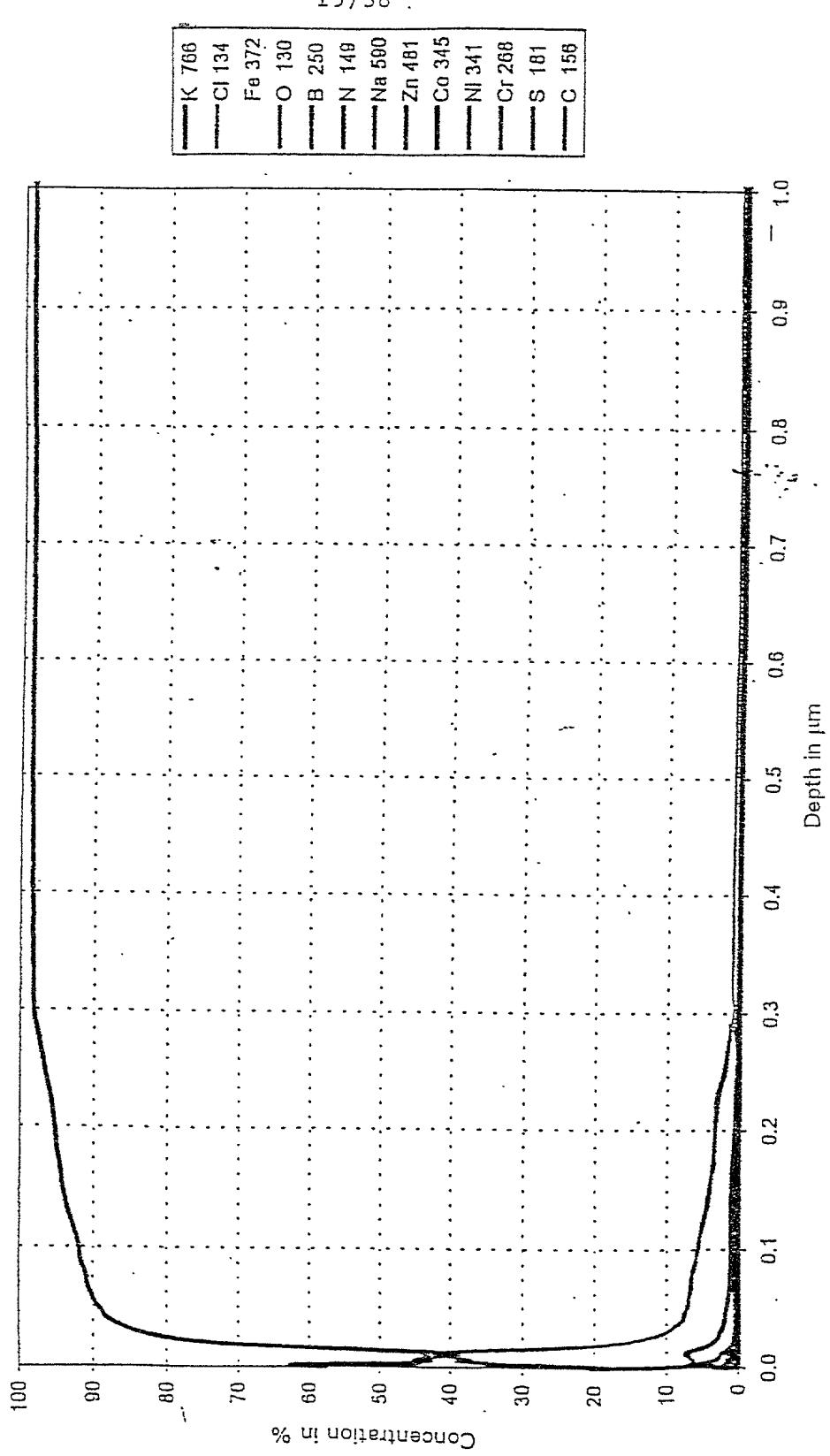


FIG. 16

Diagram 2

Sample 4, Measurement Position A

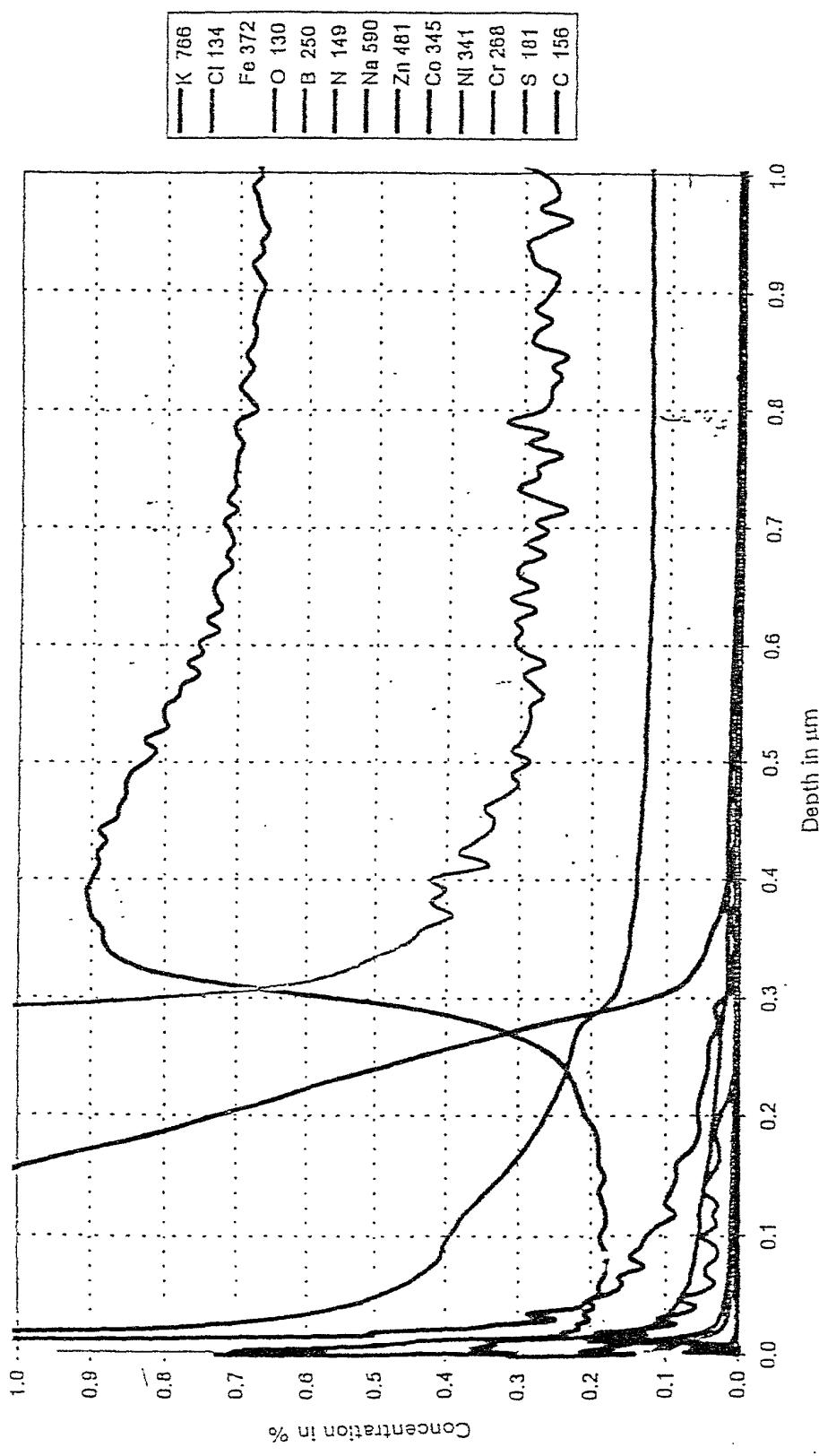
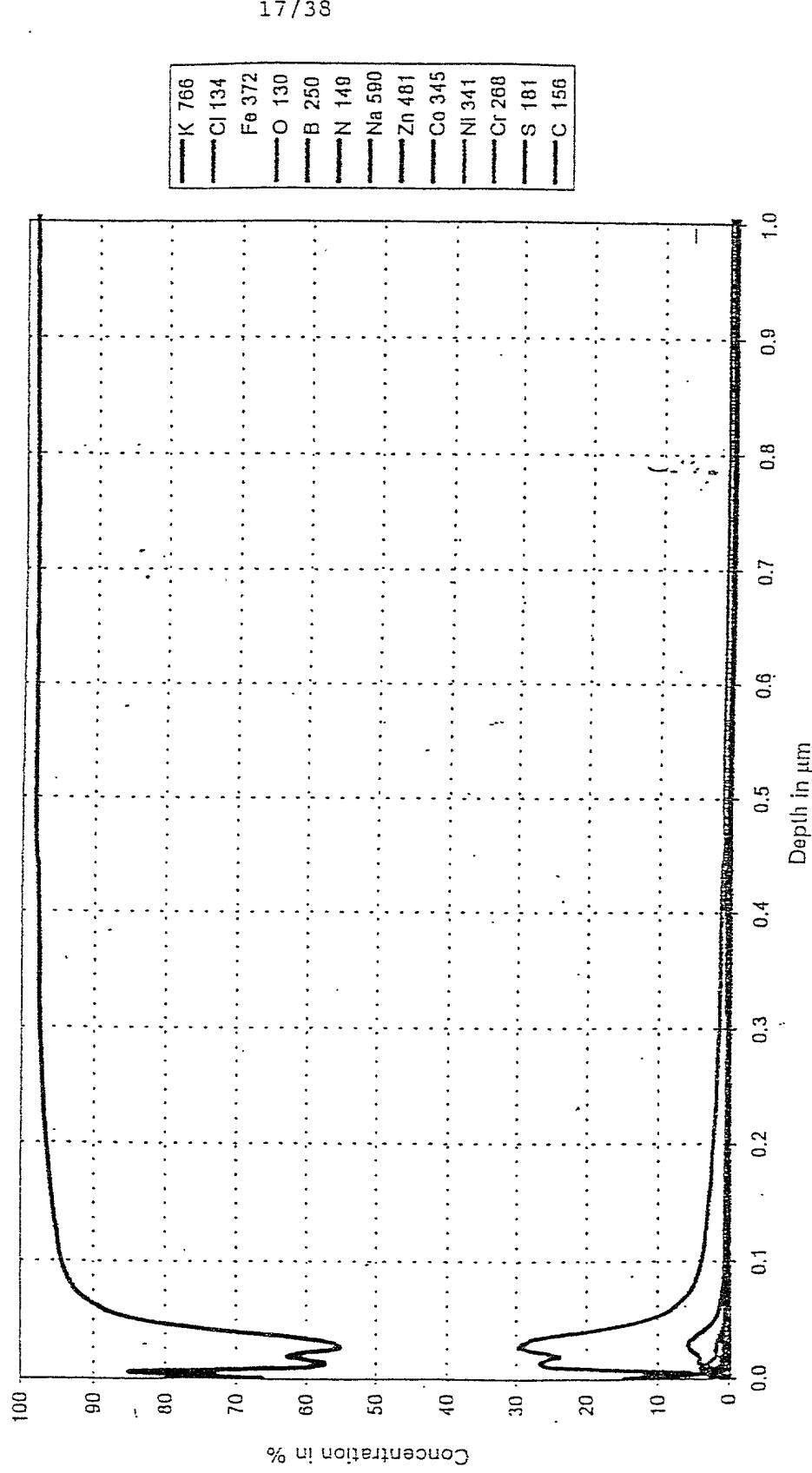


FIG. 17

Diagram 1

Sample 5, Measurement Position A



Sample 5, Measurement Position A

Diagram 2

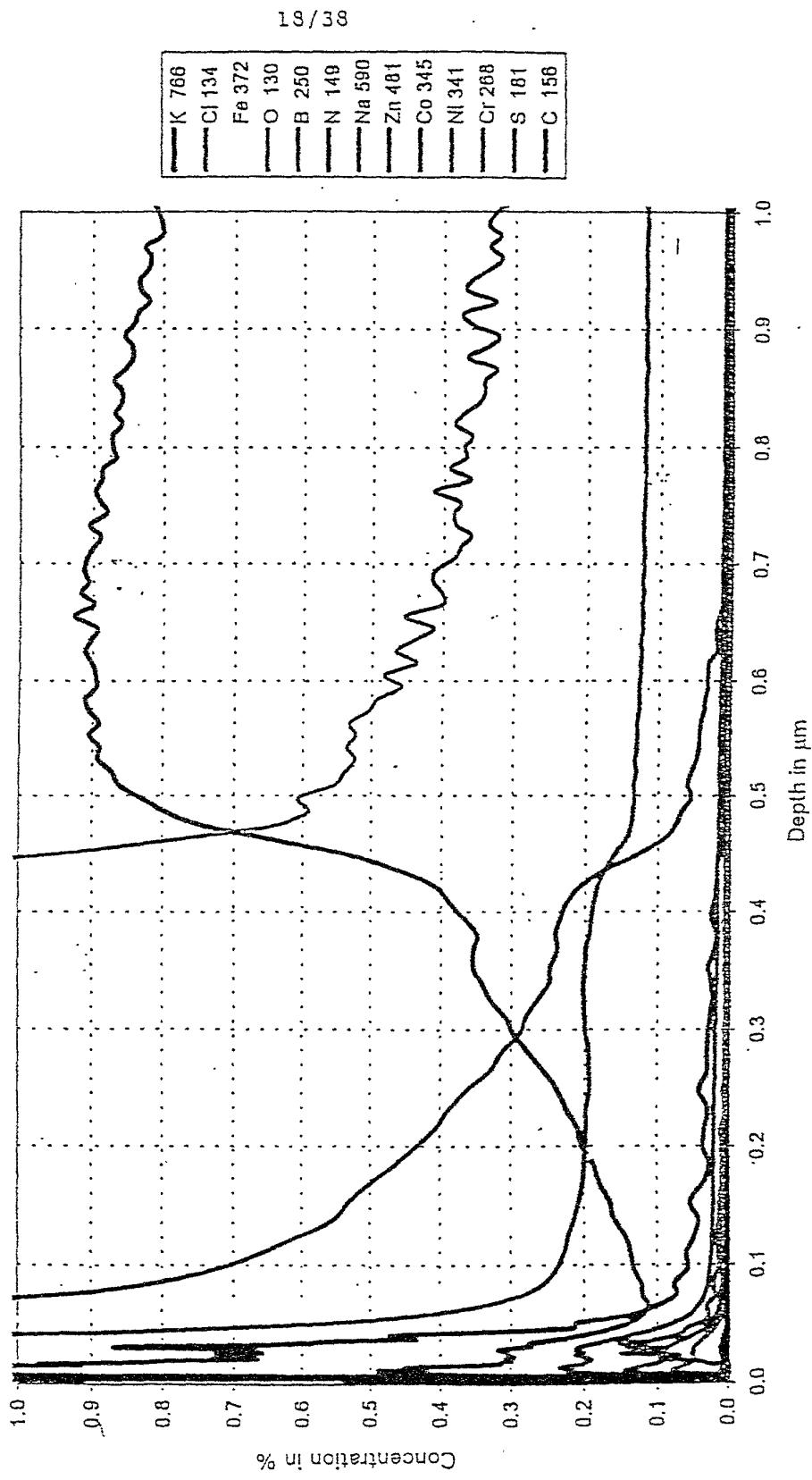


FIG. 19

Sample 6, Measurement Position A

Diagram 1

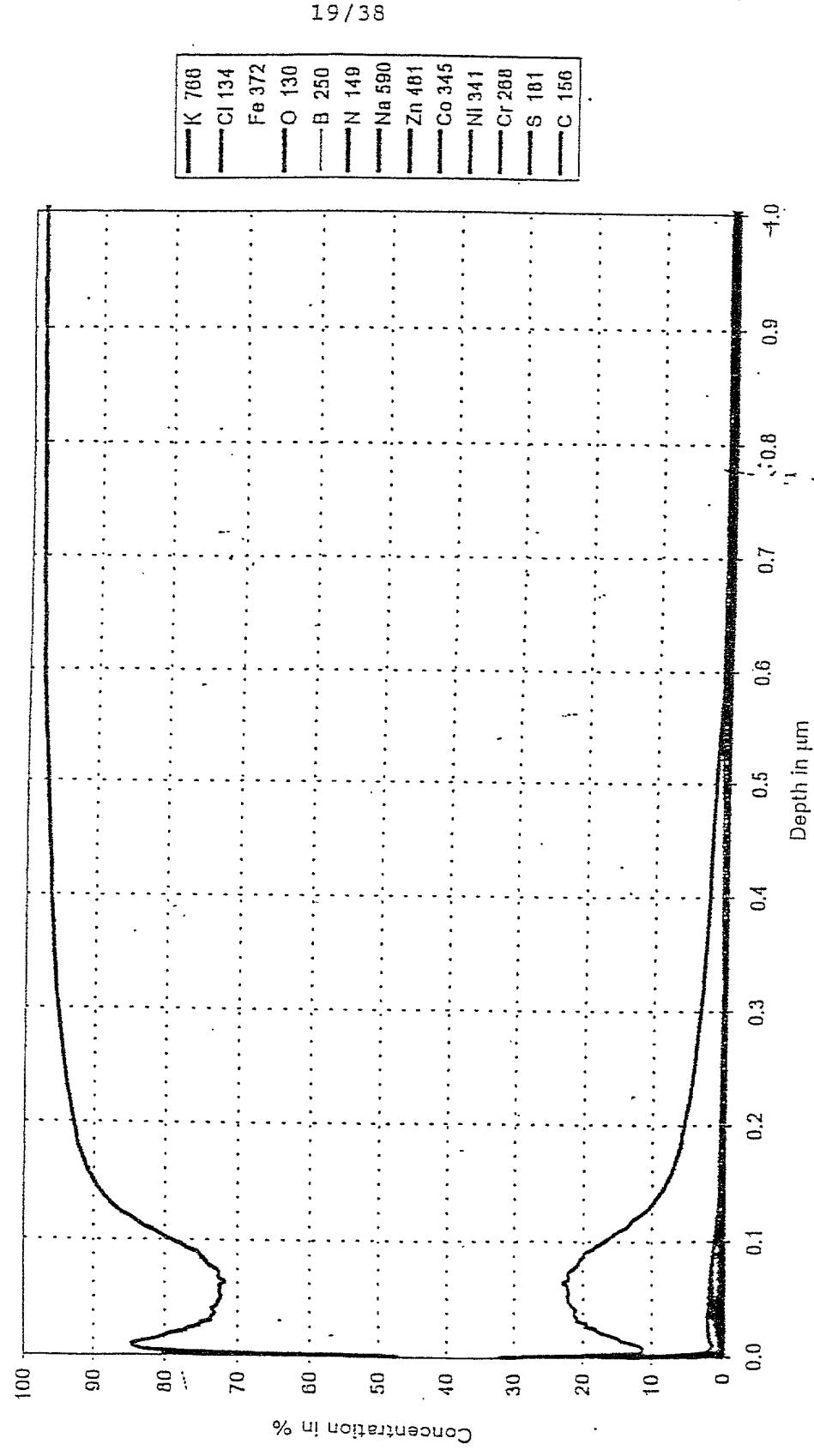
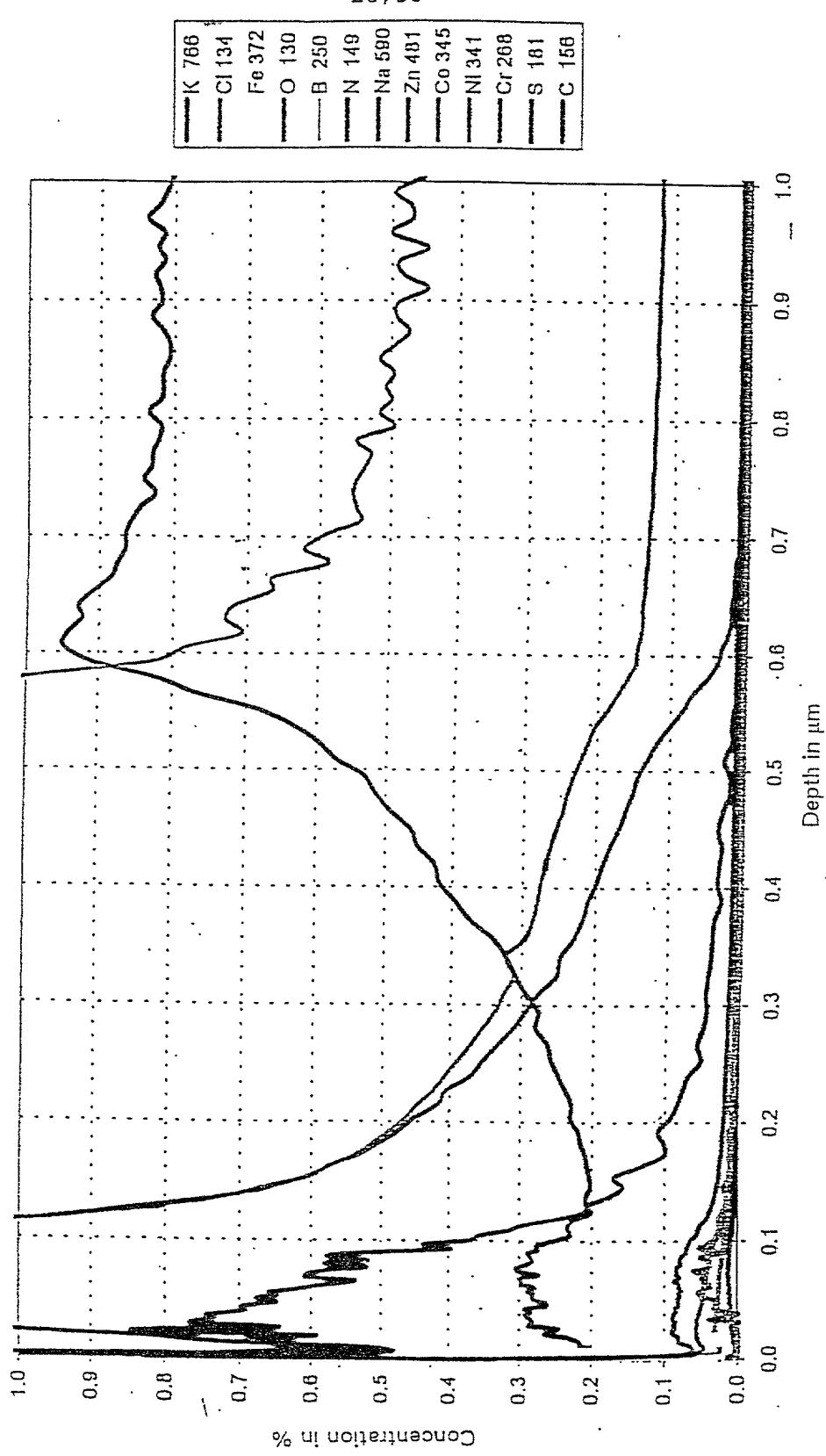


FIG. 20

Diagram 1

Sample 6, Measurement Position A



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FIG. 21

Diagram 1
Sample 6, Measurement Position B

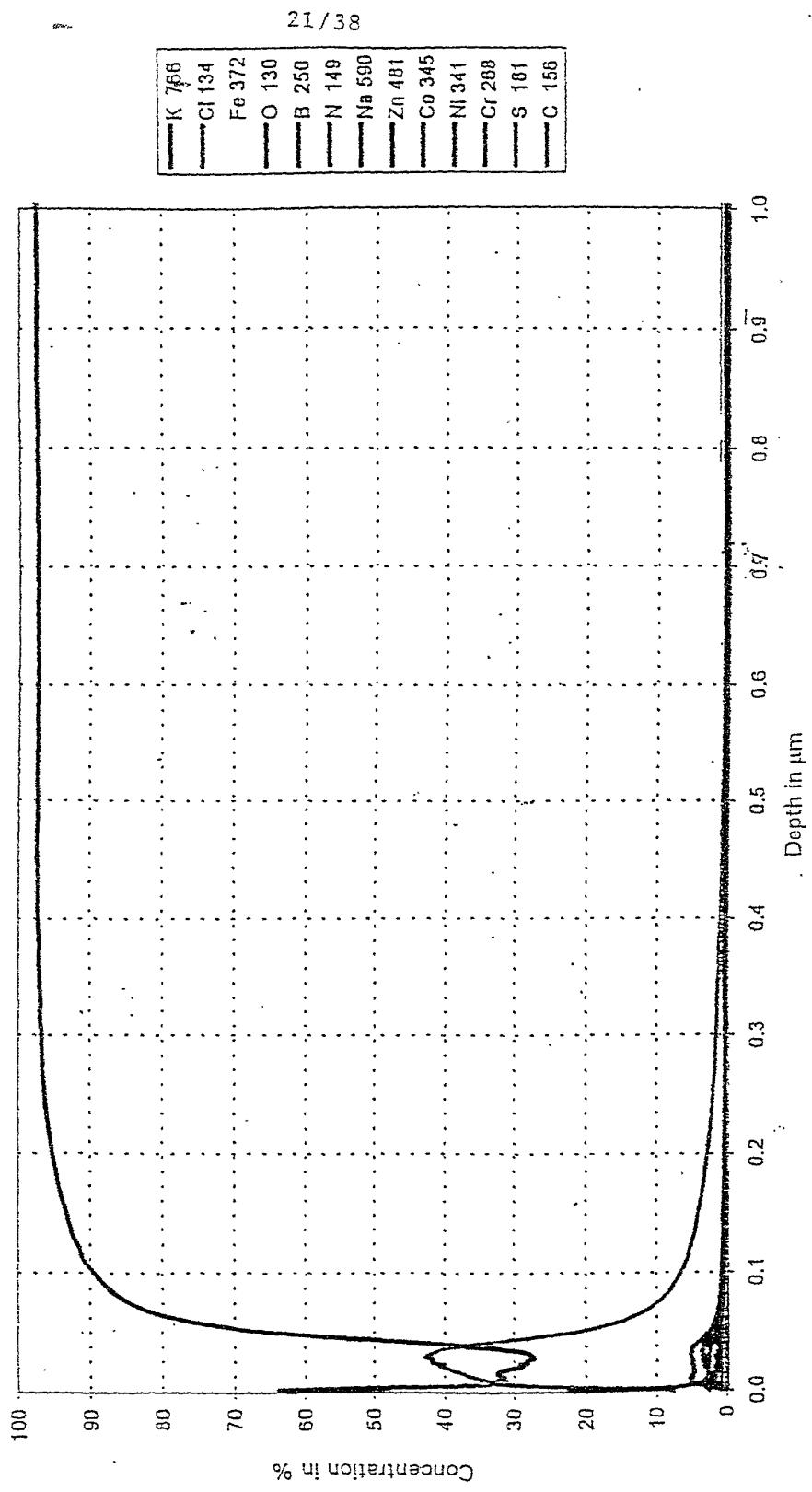


FIG. 22

Sample 6, Measurement Position B

Diagram 2

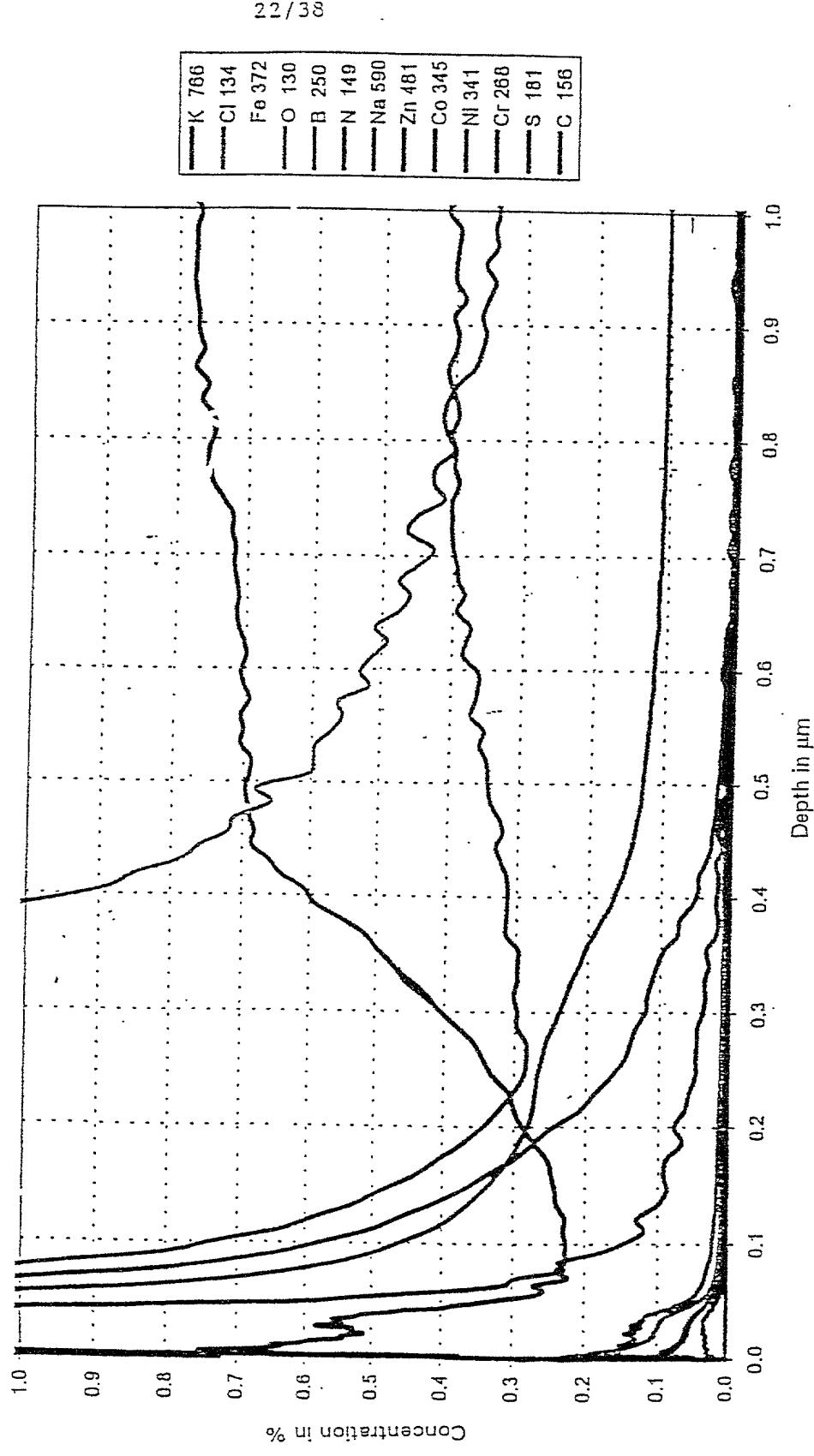


FIG. 23

Diagram 1

Sample 6, Measurement Position C

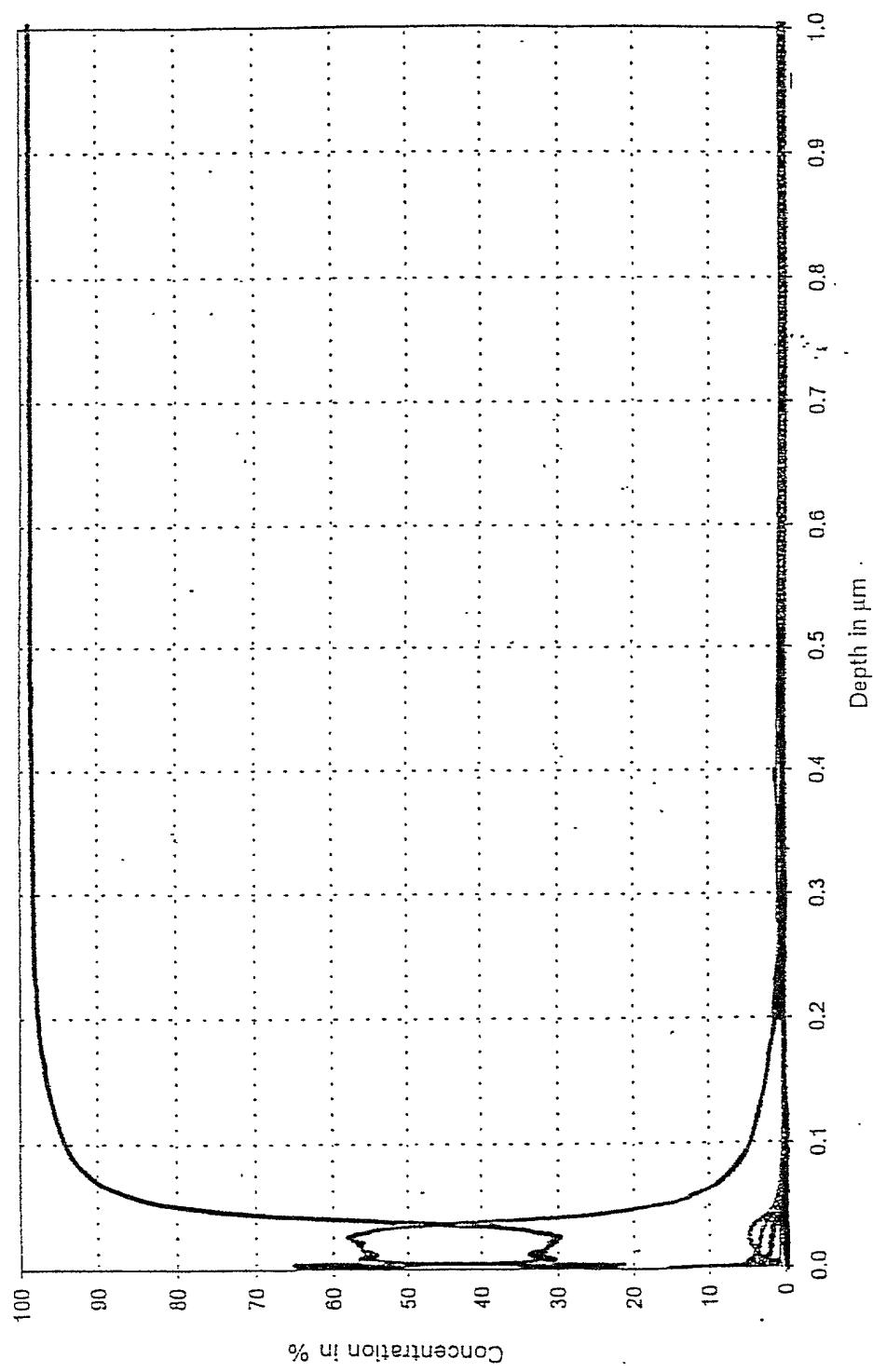


FIG. 24

Diagram 2

Sample 6, Measurement Position C

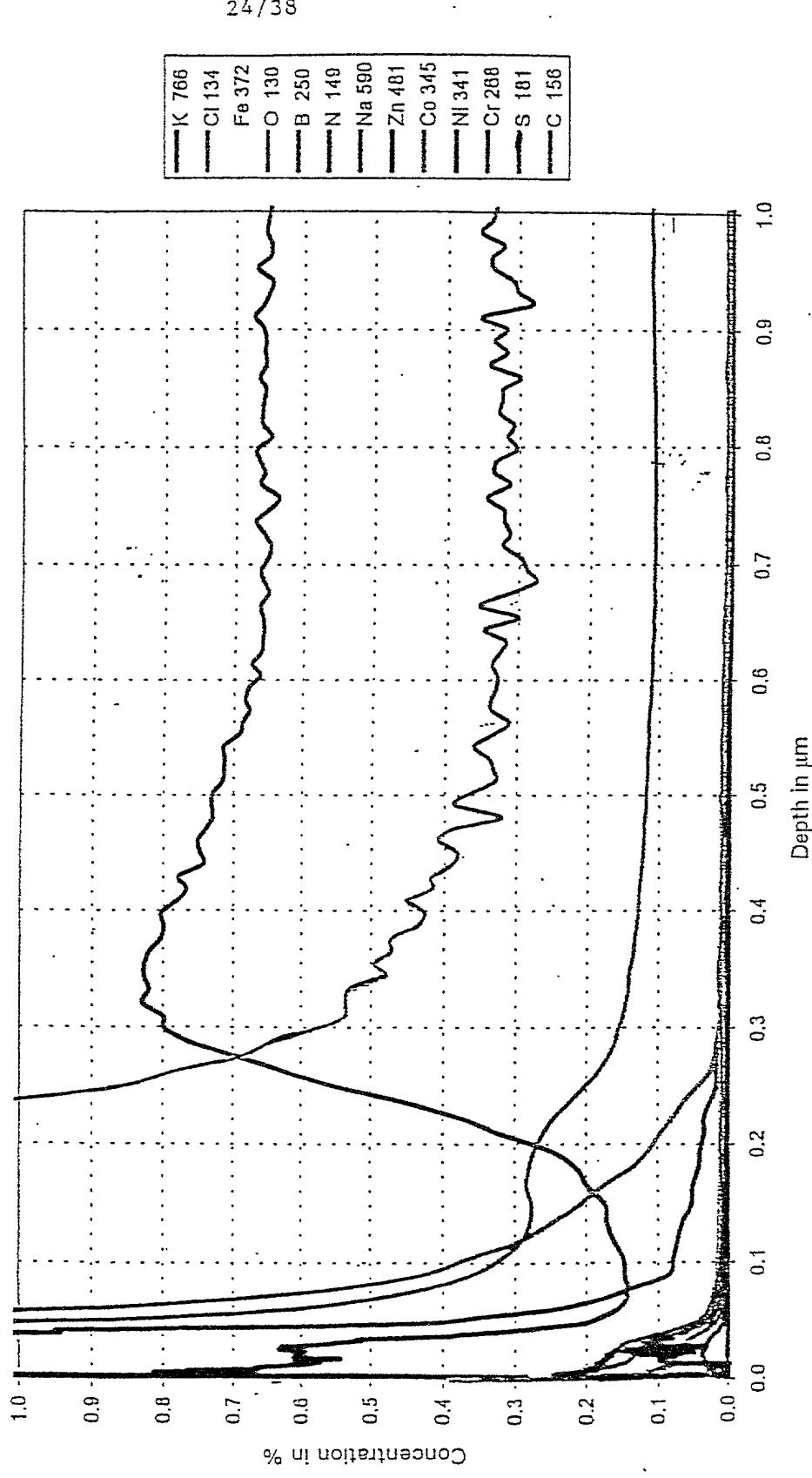


Diagram 1

Sample 6, Measurement Position D

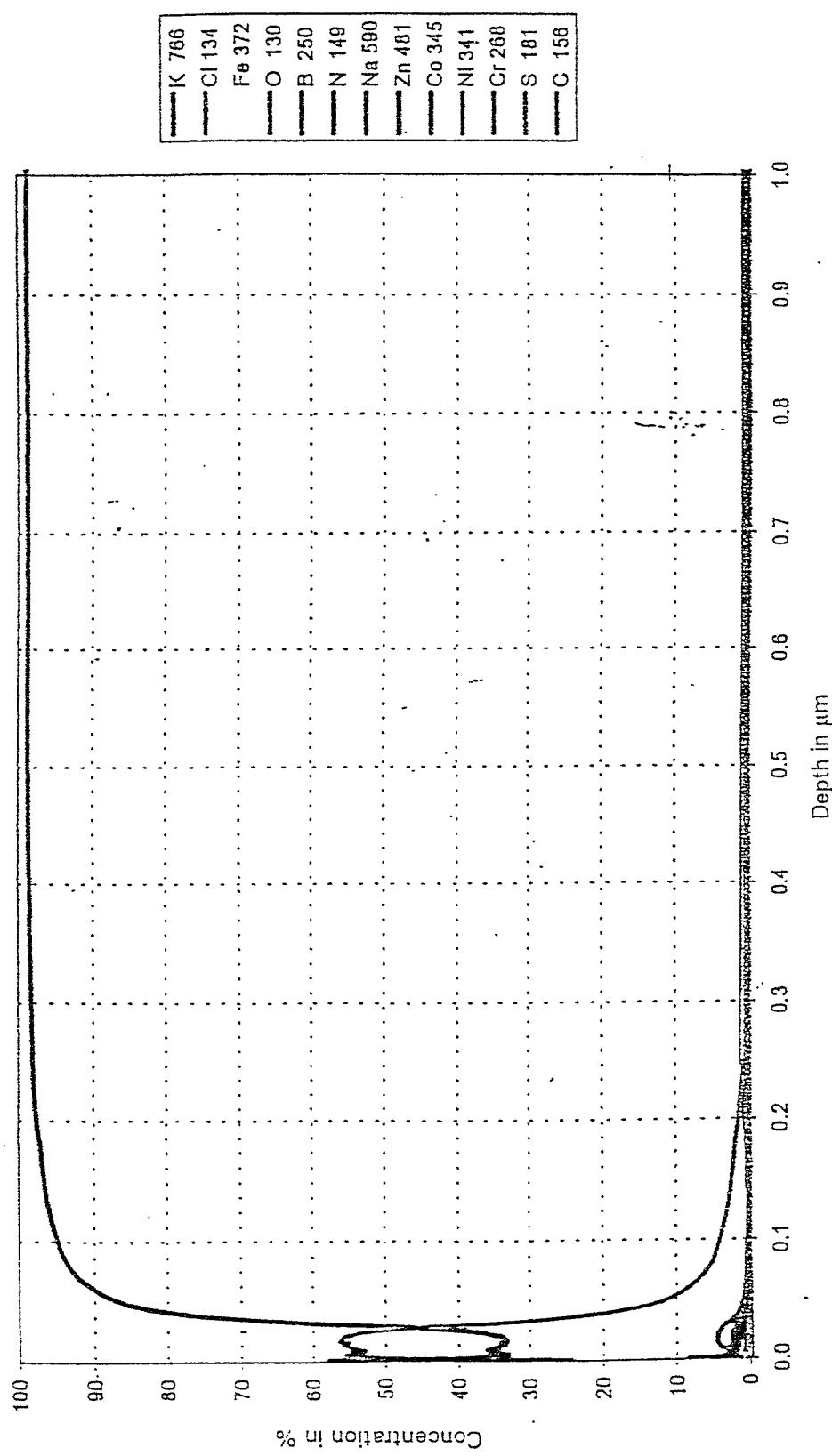


FIG. 26

Sample 6, Measurement Position D

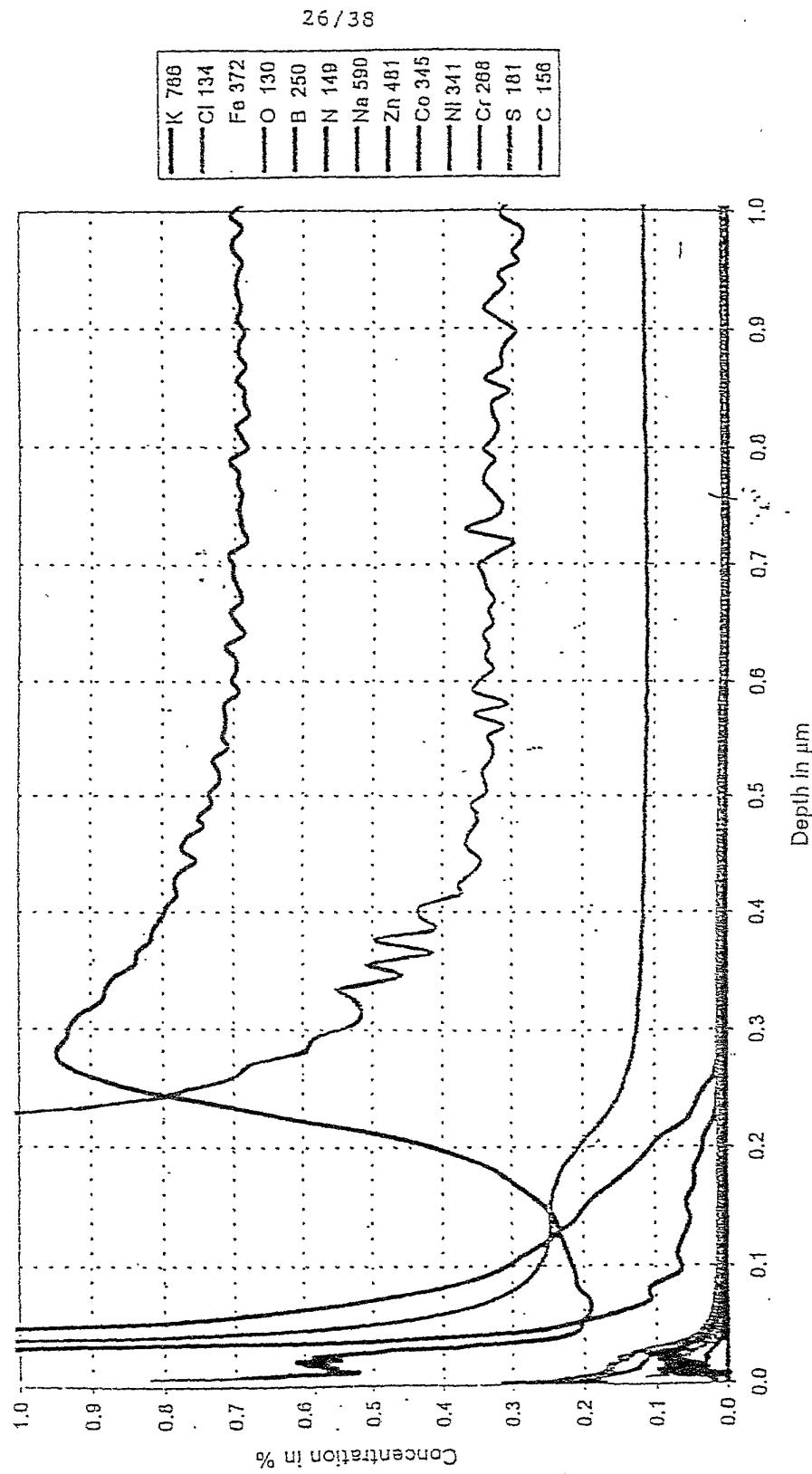


FIG. 27

Diagram 1

Sample 7, Measurement Position A

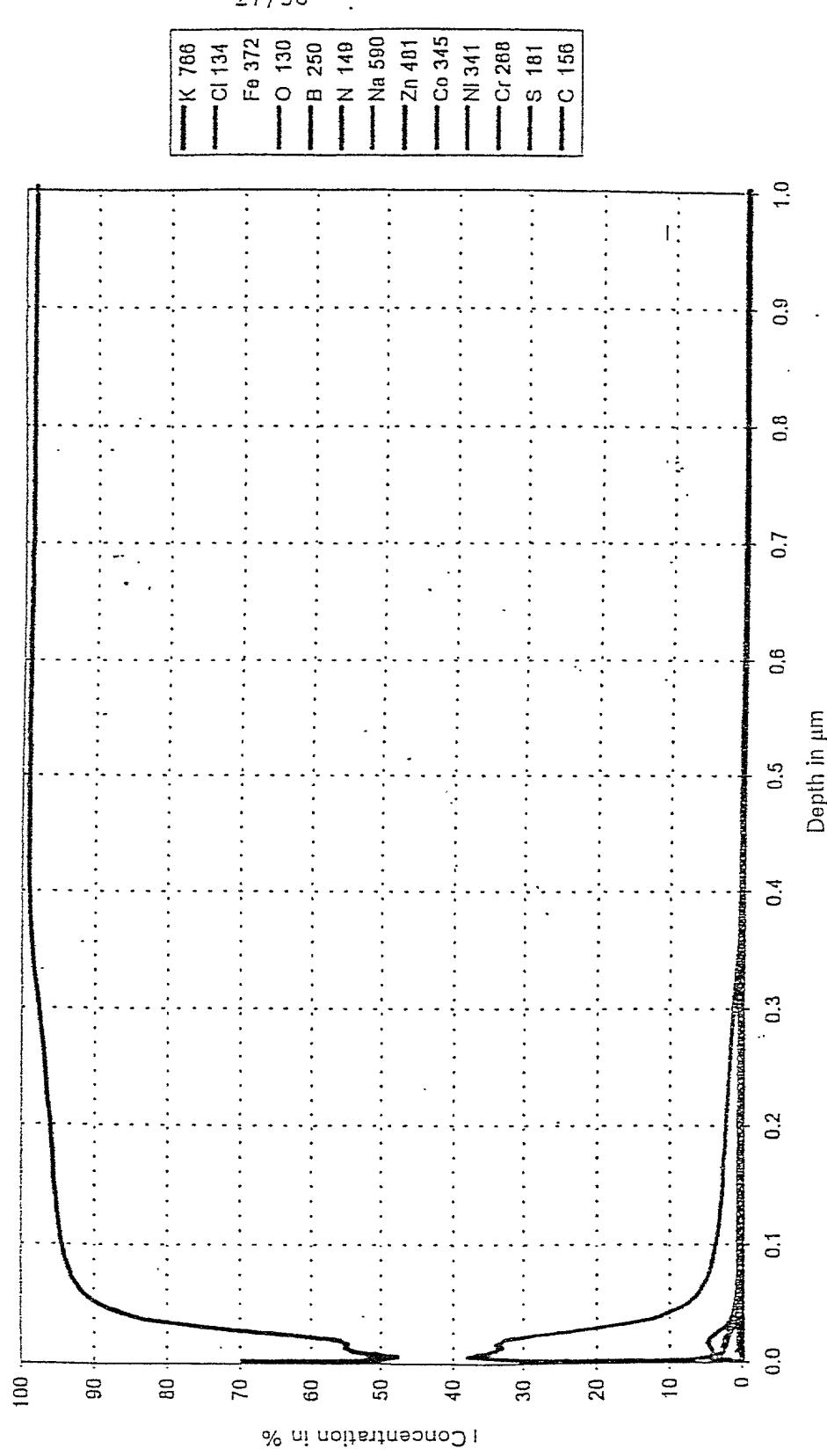


FIG. 28

Diagram 2

Sample 7, Measurement Position A

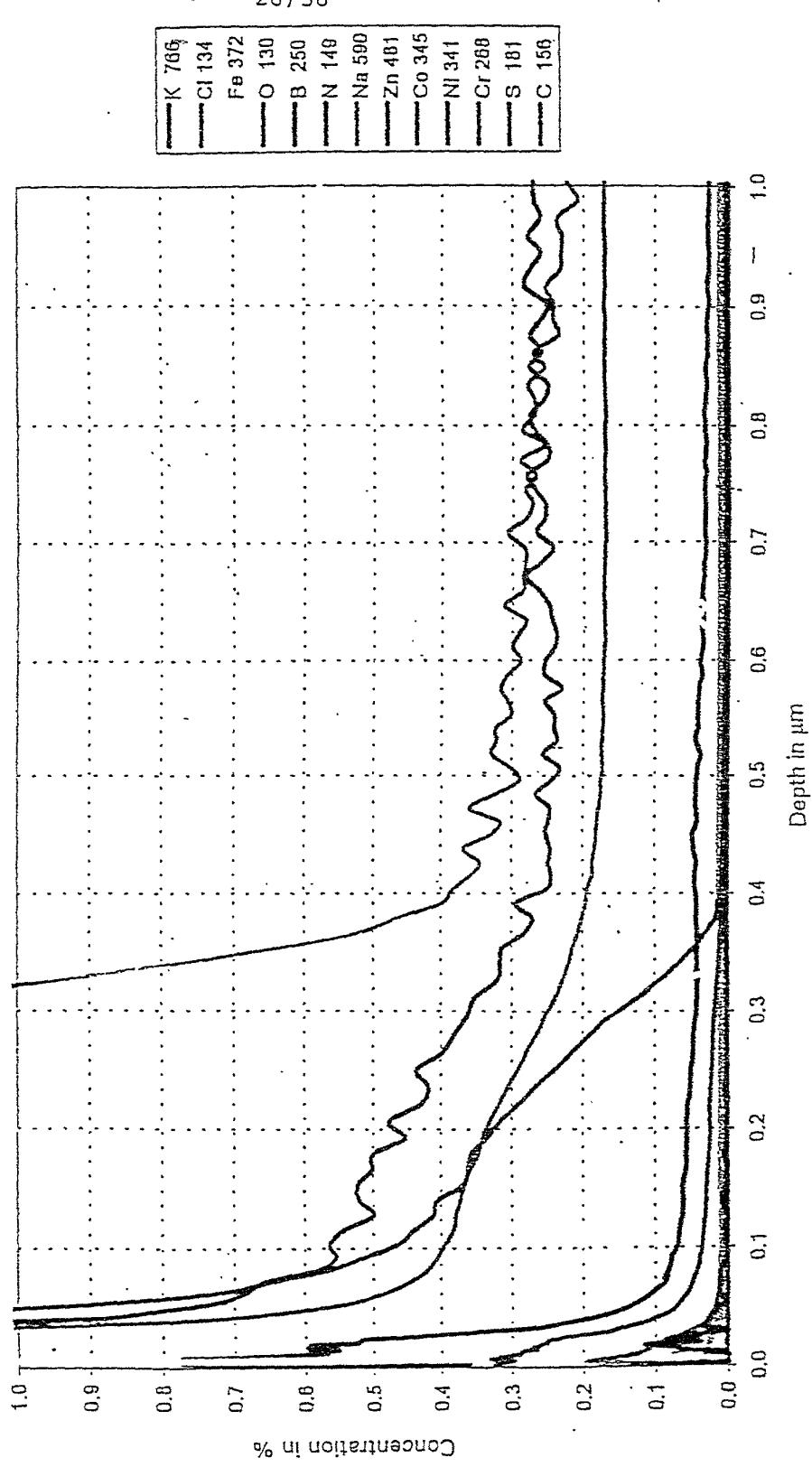


Diagram 1
Sample 7, Measurement Position B

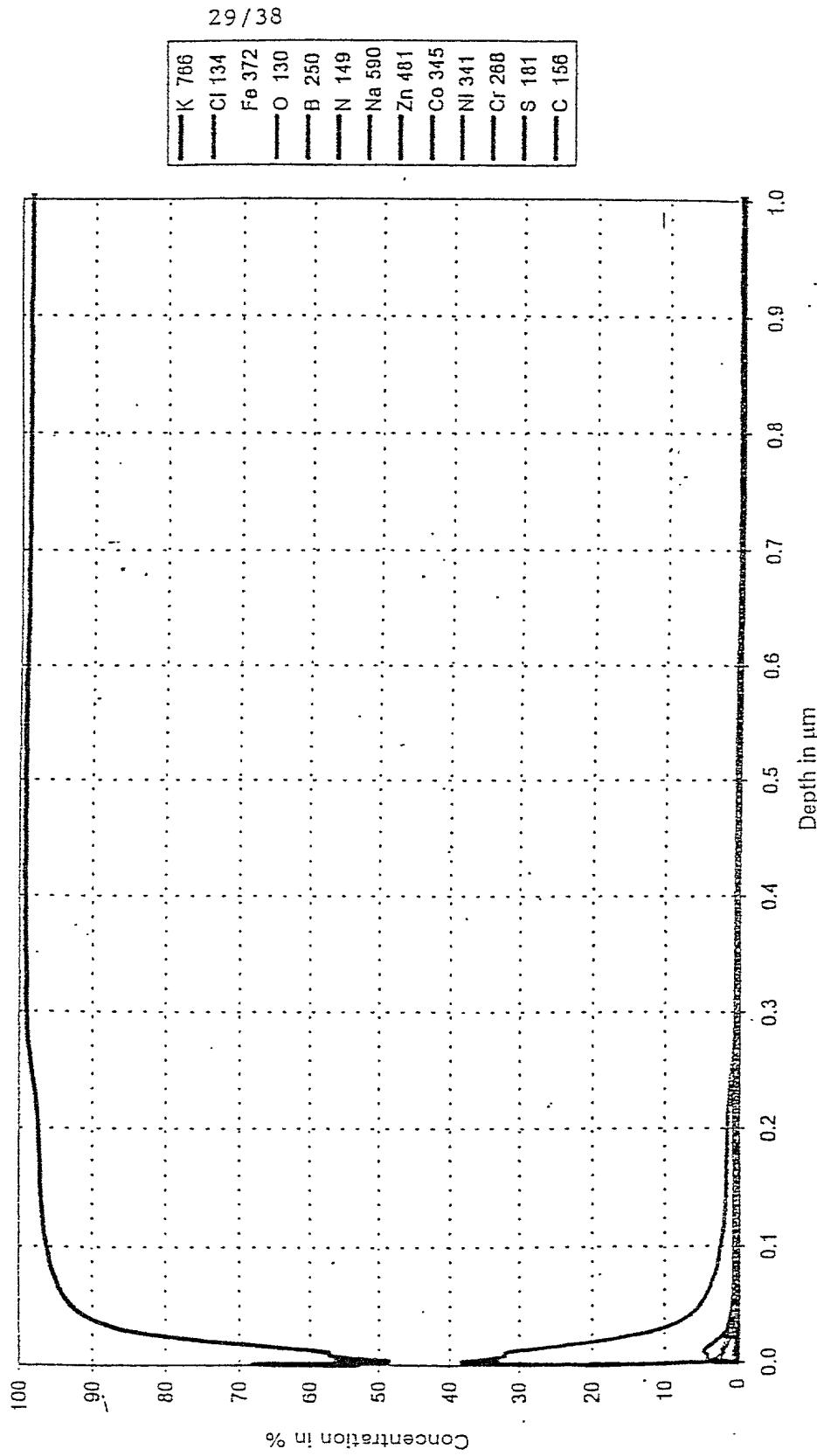


FIG. 30

Diagram 2

Sample 7, Measurement Position B

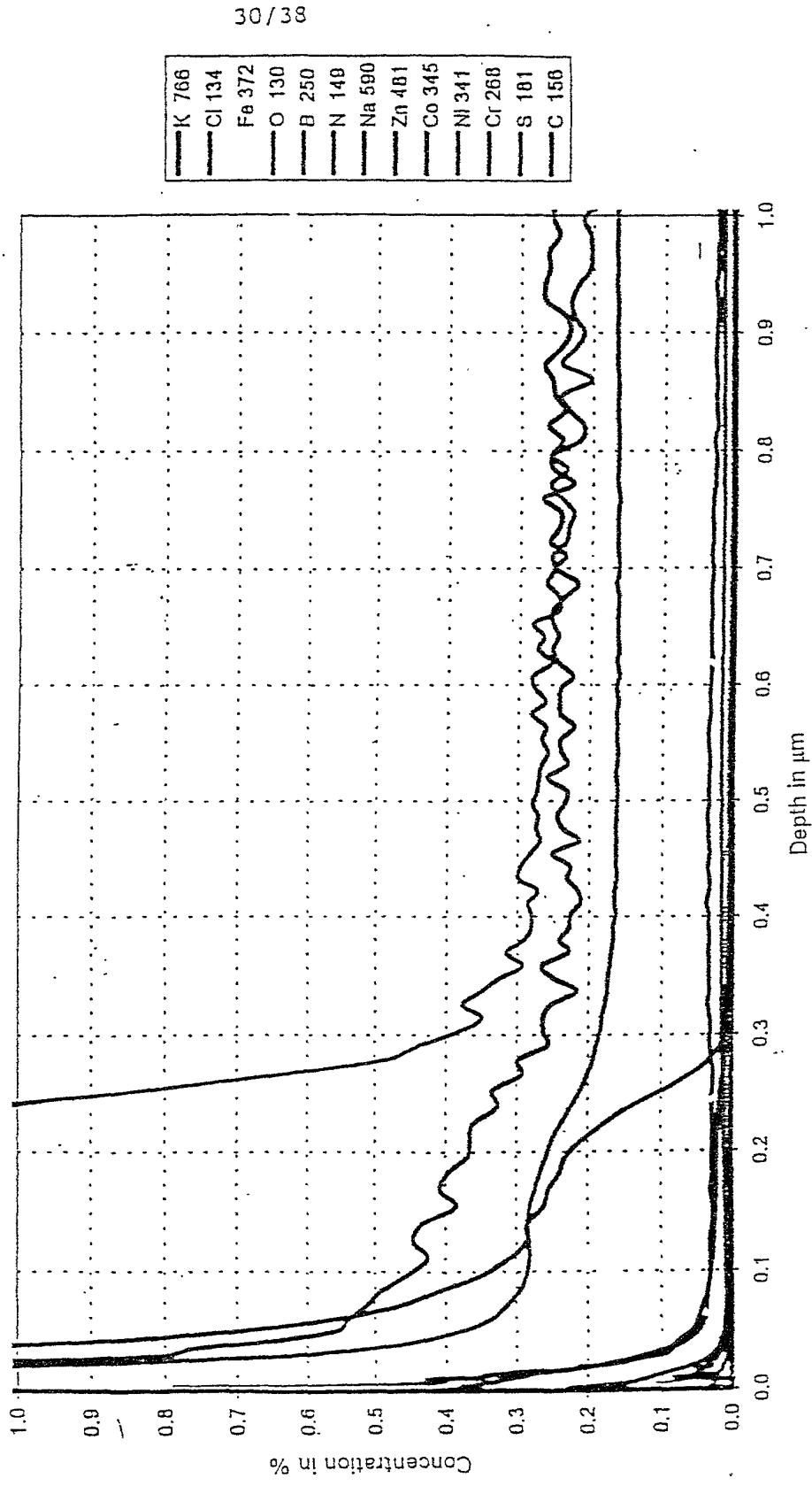


FIG. 31

Sample 8, Measurement Position A

Diagram 1

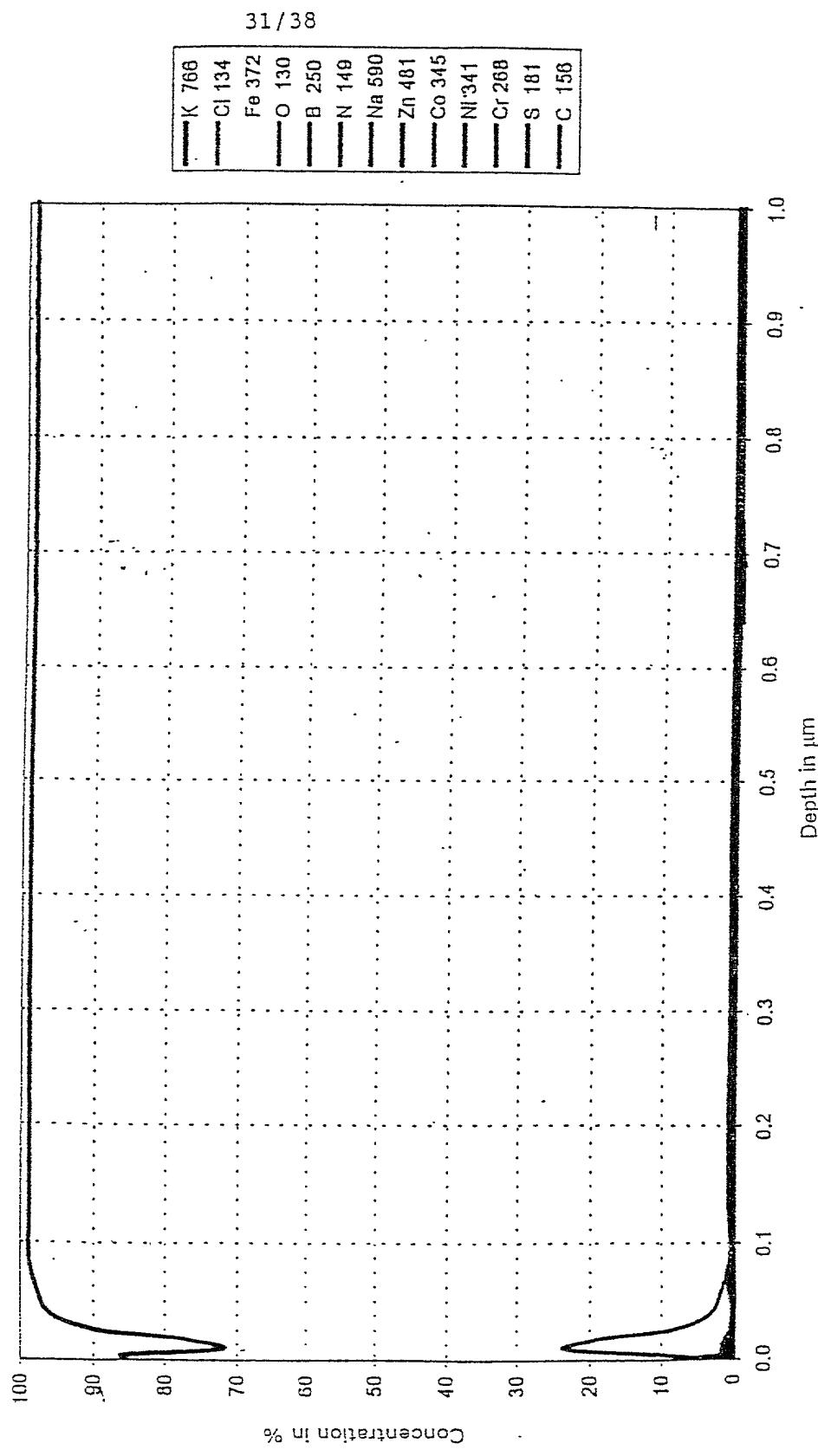


FIG. 32

Sample 8, Measurement Position A

Diagram 2

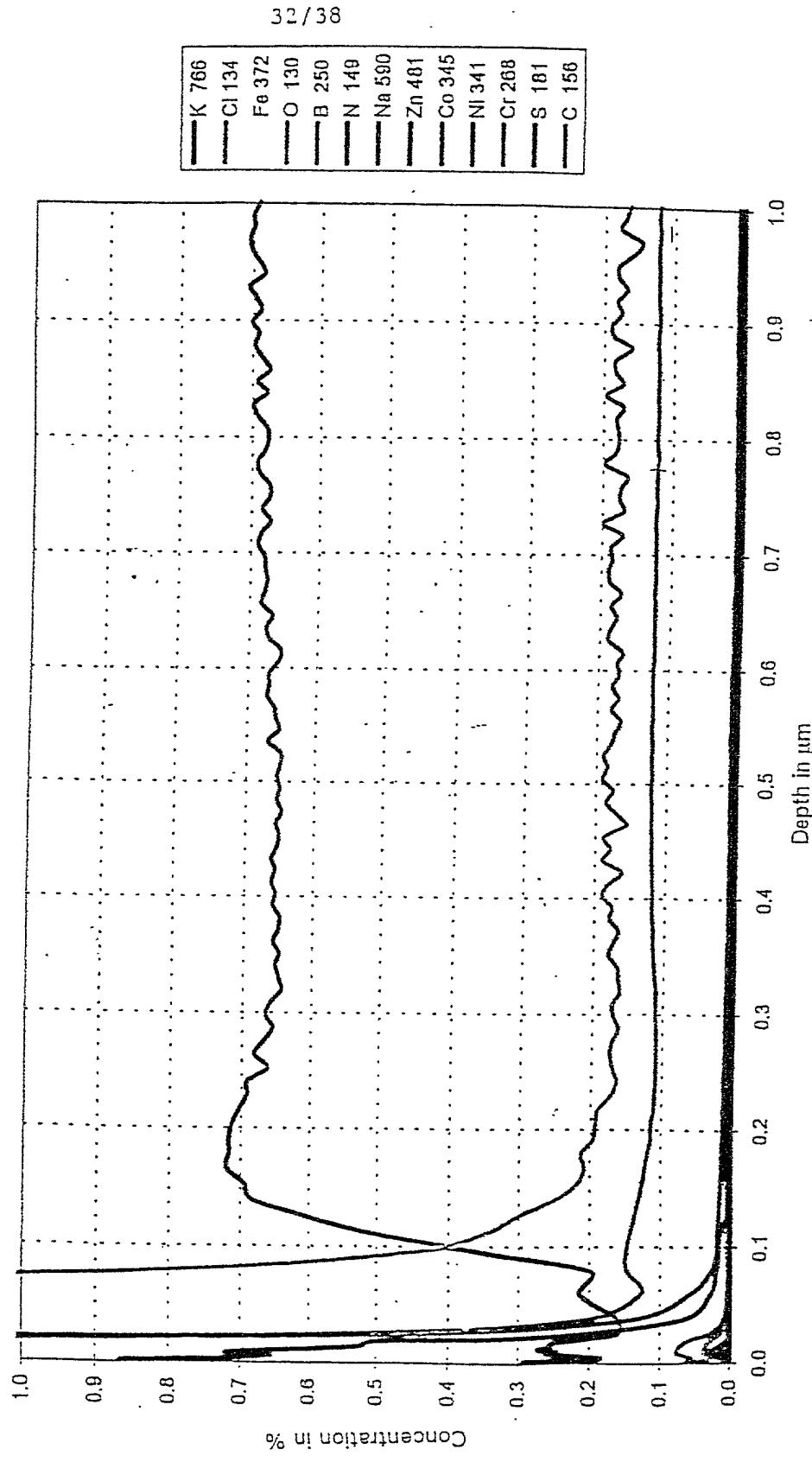


FIG. 33

Diagram 1

Sample 9, Measurement Position A

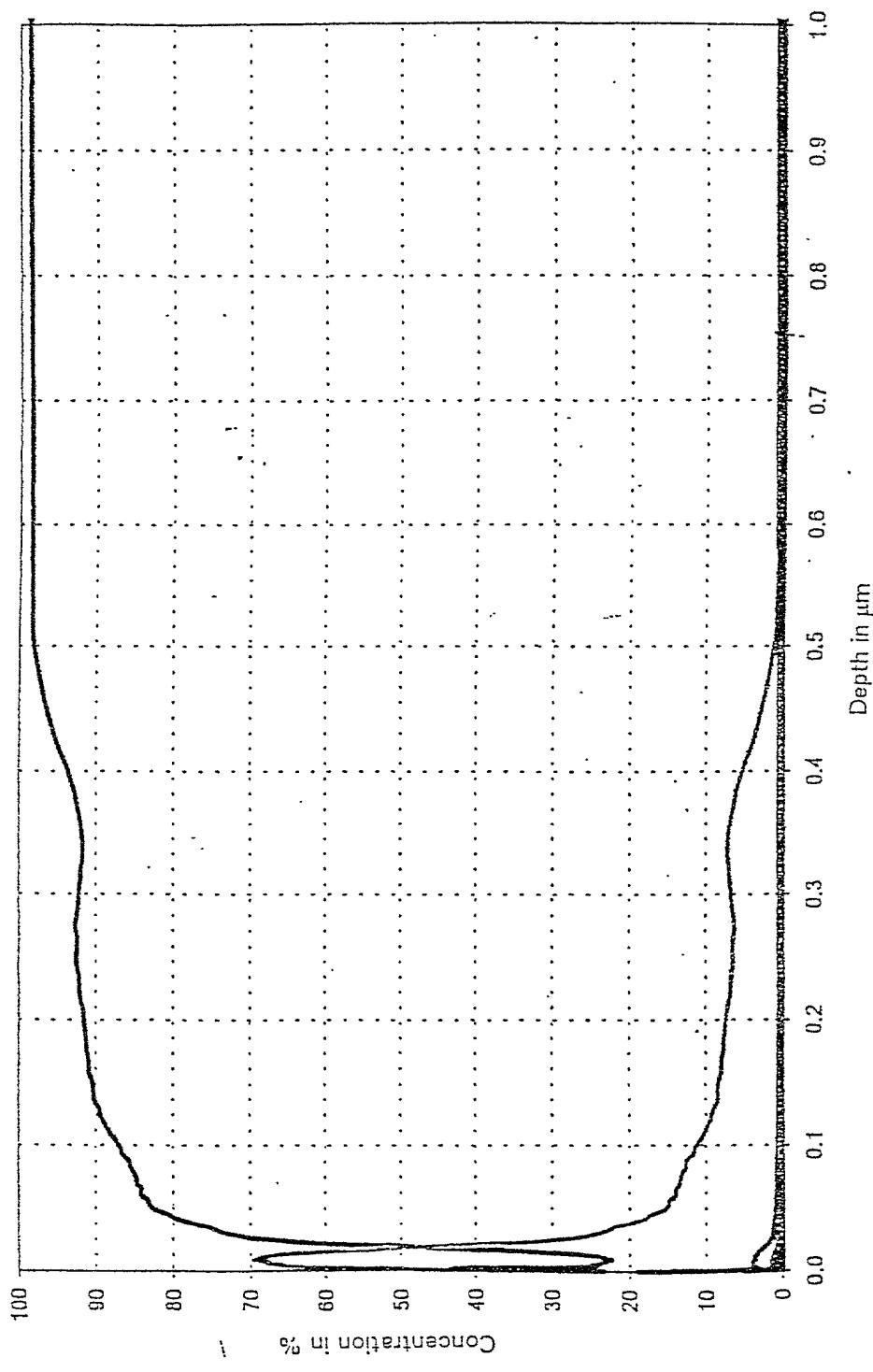


FIG. 34

Sample 9, Measurement Position A

Diagram 2

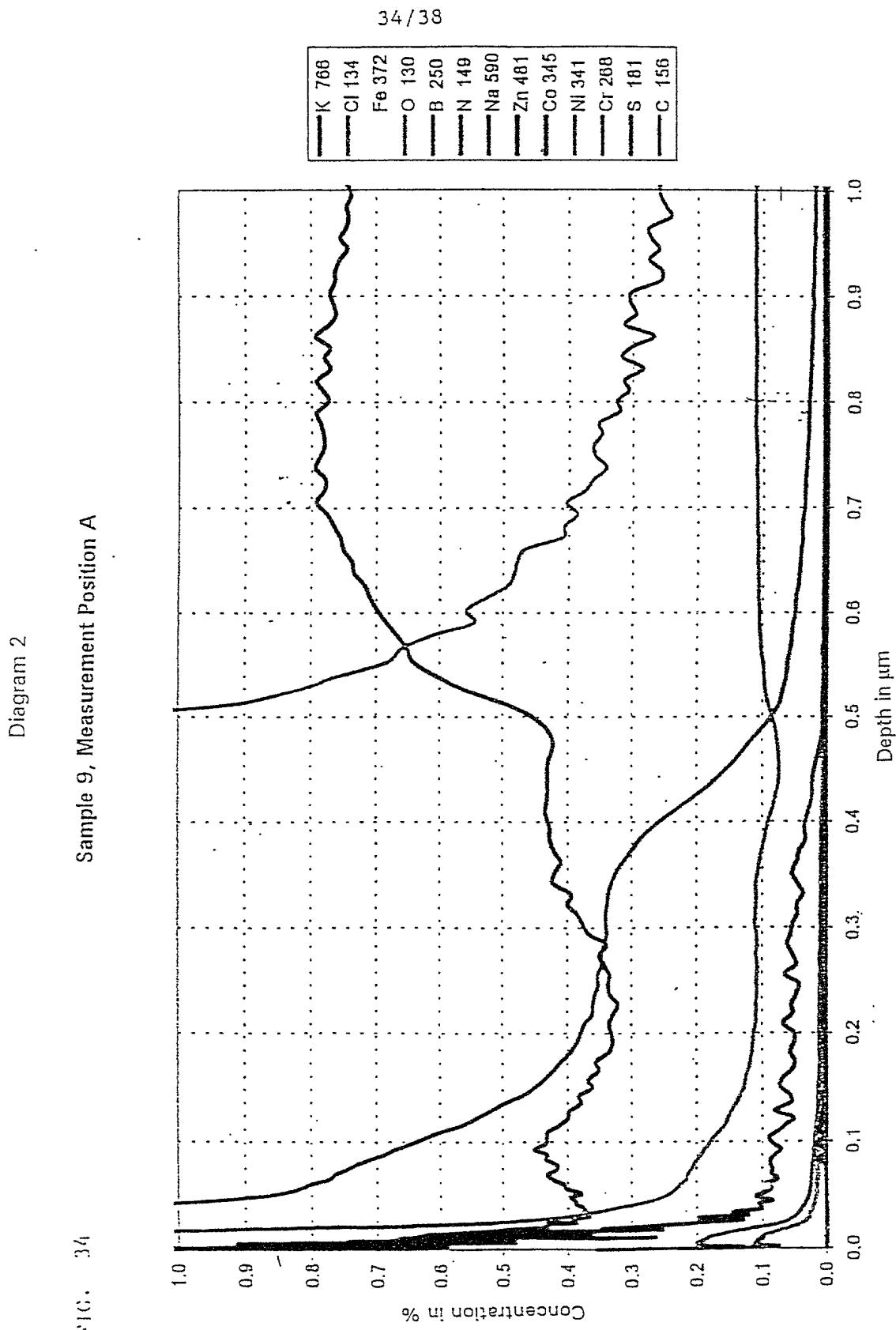


FIG. 35

Sample 9, Measurement Position B

Diagram 1

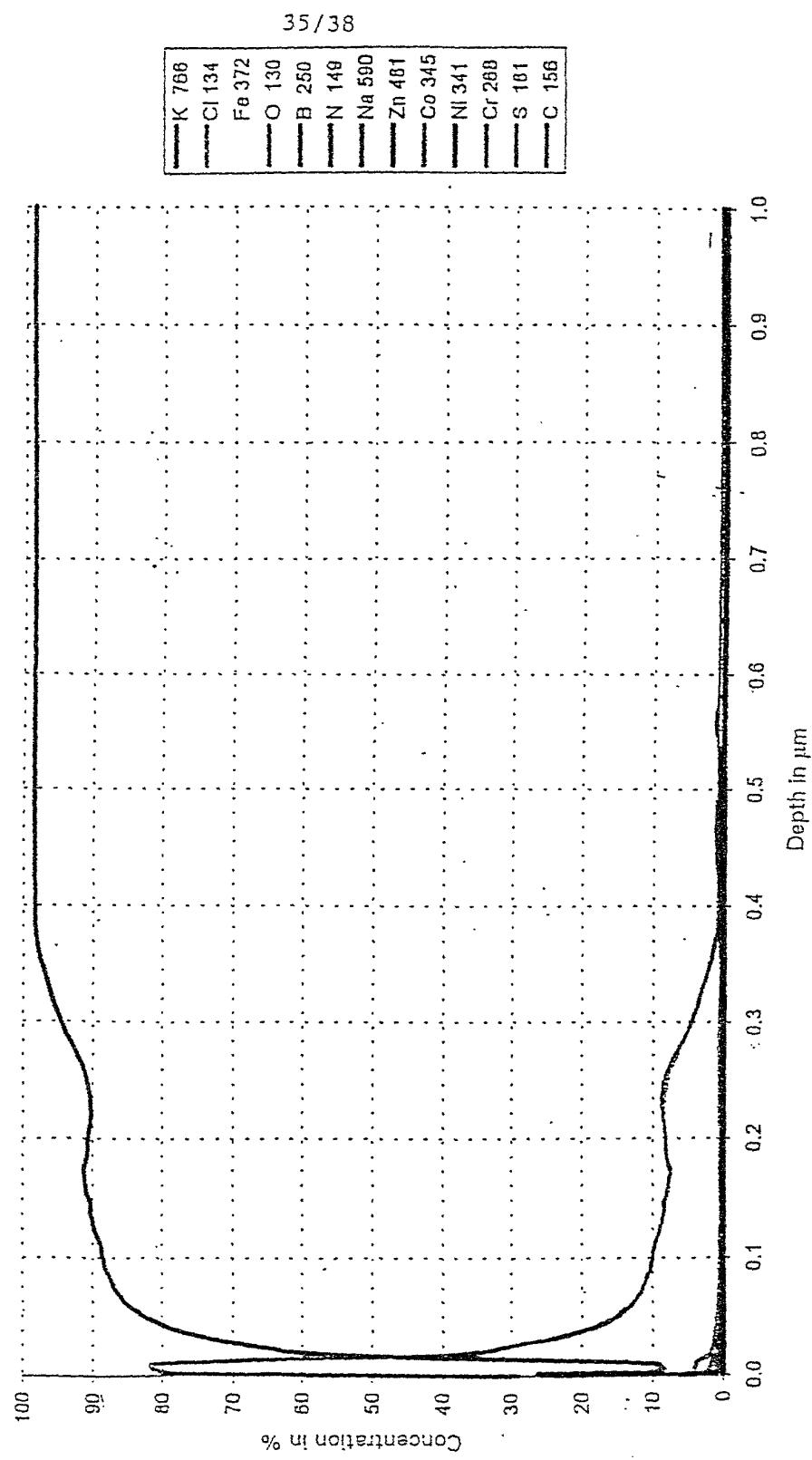


FIG. 36

Diagram 2

Sample 9, Measurement Position B

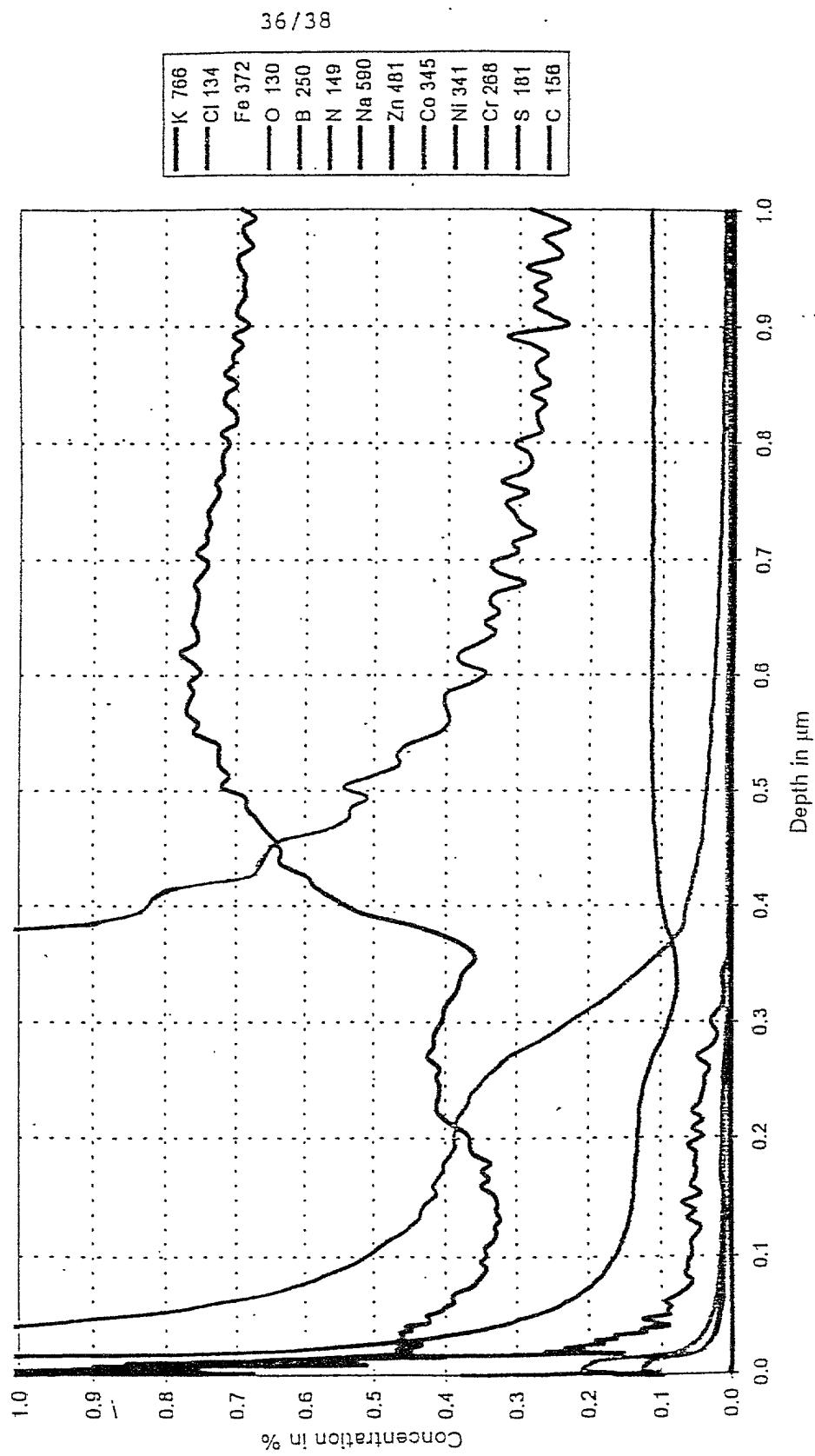


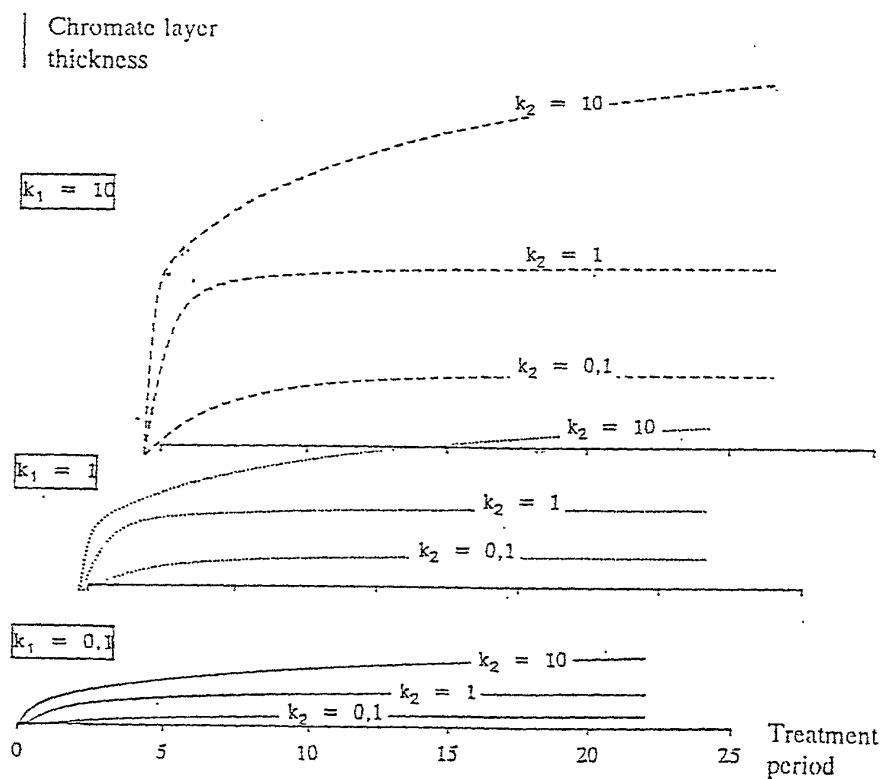
FIG. 37

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	Methods						
	Ellipsometry nm	SEM nm	Glow-discharge spectrometer nm (Cr > 1%)	with Cr (%)	chromium index nm (Cr > Zn)	nm (Cr > 30%)	Sample No.
1. Prior Art							
Yellow chromation Cr(III) + Cr(V)	-	300	440	11	48	17	25
Blue chromation Cr(III)	98	60	60	8	5	0	0
2. Invention (Chromitiation)							
60°C Cr(III)	432	300	344	7	23	2	16
100°C Cr(III)	595	-	358	10	38	22	28
60°C on Zn/Fe Cr(III)	-	-	282	6	16	0	16
100°C, two-fold concentration Cr(III)	953	-	-	-	-	-	7

Fig. 38

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Computer simulation of the kinetic model of
chromate coating of zinc for various rate constants